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# AUTOMOTIVE INDUSTRIES

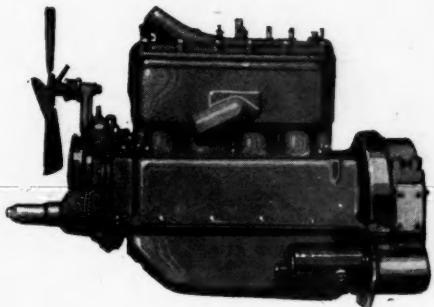
*The* AUTOMOBILE

Vol. XLIV.  
Number 19.

PUBLISHED WEEKLY AT 239 WEST 39th STREET  
NEW YORK, MAY 12, 1921

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DETROIT - MICHIGAN

# AUTOMOTIVE INDUSTRIES

*The* AUTOMOBILE

VOL. XLIV.

NEW YORK—THURSDAY, MAY 12, 1921

No. 19

## Long Credits Greatest Need, Voice of Export Meeting

World's buying needs only temporarily halted and sales will quickly be revived if we can grant terms, is the sentiment of Eighth Annual Foreign Convention. Domestic finances ample to aid situation

By David Beecroft

**N**O words spoken to the 2000 delegates of the Eighth National Foreign Trade Convention, during the four-day session at Cleveland last week, struck a stronger sentiment or was received with more zest than those of W. P. G. Harding, Governor of the Federal Reserve Board, who, in speaking on the financial and industrial situation of to-day, declared:

**"We are on a very much safer basis today than a year ago. The Federal Reserve Banks are today in a strong position, with an average reserve percentage of gold and lawful money against deposits and note issues of 55 per cent as compared with 42 per cent a year ago. The reserves of the Federal Reserve Banks are now on a higher basis than they have been since the fall of 1918 before floating the fourth Liberty Loan."**

Governor Harding followed this declaration with the suggestion to industry that liquidation has proceeded as far as necessary and that many industries having liquidated to the bone, the Federal Reserve Banks are now able to take part in the movement to stimulate business with a view of liquidating credits that have not been ready previously for this operation. He added:

**"The present is a time for courage. In the present situation, when many institutions find credits formerly liquid now in a frozen state, it is important**

that something be done to start a movement to stabilize business by liquidating these frozen credits. The banks that are carrying these frozen credits have assets back of them to protect them, but they are in turn called upon to furnish new credits for productive processes. Any loan made to-day on a basis of current values is necessarily a sounder and safer one than loans made a year ago on the basis of values then obtainable. Frozen credits can best be thawed by a movement to do business, and in that new movement should not be overlooked the necessity of building up our foreign trade.

**"With liquidation as it has taken place in the past year behind us, those industries that have liquidated should be encouraged to build themselves up, and herein is the reason to-day for renewed courage and confidence. We will reach and are reaching every day a safer basis on which to do business. Production cost will be reduced; certain prices will be badly depressed, some to below costs of production and even below the 10-year average, and then will advance to the common level, and the prices of other products will come down to meet them."**

### Business Dishonesty

Not less important as signifying the attitude of the delegates was the warmth with which the statement of Fred I. Kent, Bankers' Trust Co., to the effect

that the result of the devastation to industry wrought through business dishonesty has probably been more detrimental to the world at large than the devastation caused directly by the war. Kent was not the only speaker of the convention to refer to the deplorable lack of business integrity that has exhibited itself since the armistice. It was a very recurrent convention topic, coming to the surface in the general sessions of the convention as well as in the group sessions. The total loss of respect for contracts had ramifications not appreciated by many. Kent looks for business improvement just as soon as moral improvement occurs, and the speed of business improvement will largely depend on the speed of moral improvement and the speed at which pre-war respect for contracts returns.

Speaking specifically on this subject, Kent contrasted the trade relationships between the American producer and the foreign buyer previous to the war with recent relationships, saying:

"Under ordinary conditions, with law and order enforced throughout the world and integrity and purpose as it once existed, general letters of credit as used previous to the war answered all the demands of foreign trade. Then the foreign trade of the world was carried on as successfully as domestic trade, and the danger involved in time and place between buyer and seller was practically eliminated.

"Under conditions as developed since the war, the importer of American products has not been properly protected. He could not force shipments by the manufacturer. During times of rising prices the exporter could break his contract and neglect to make shipments, notwithstanding that the importer had sales made against such purchases and, when the goods did not arrive, could not make deliveries and was obliged to break his contract under penalty.

#### Shipments As Prices Fall

"The difficulty of the importer was further aggravated when prices began to fall and foreign exporters, who had letters of credit in their possession which had not yet expired, took advantage of the situation and made shipments. In many cases importers, not expecting to receive goods because of previous default in shipments, had contracted for other goods. This form of dishonesty on the part of exporters was exercised in many cases where satisfactory relations had been carried on between the manufacturer and importer for four years.

"As a result of this situation, seaports are clogged with goods which cannot be disposed of without great loss and which have aggravated stagnation in trade. Unfortunately, foreign exporters and importers have not been the only delinquents, as many Americans have been just as bad. During the time of falling prices, repudiation in connection with domestic trade was as general as in foreign trade. While prices were rising, manufacturers and producers failed to make deliveries; when prices began to fall, purchasers refused to accept goods contracted for.

"That such a development should occur in the United States shows the depth to which the level of integrity had fallen, due to the world-wide propaganda that has been carried on by those who would destroy the institutions of civilization in order that they might become possessors of goods which they claim others have not the right to hold. This vicious propaganda has reached its height and the morals of the people its greatest depth. A turn has taken place in the minds of men that will continue with growing force until the re-establishment of business integrity has been effected.

"As the moral forces of men gather it will again be-

come possible to carry on trade in a normal way except that it is going to take time to overcome the effect of the devastation in industry which has been wrought through dishonesty. That has probably been more detrimental to the world at large than the direct devastation caused by the war.

"During this period of reconstruction a longer period than usual is going to be required for payment of goods imported by the nationals of many countries of the world. If such additional time is not allowed, the return to normal trade is going to take longer than otherwise need be true, during which time the difficulties of all peoples will continue."

#### Longer Credits

Of prime importance for the stimulation of foreign trade, which has been falling off for several months, longer credits are necessary. **The fallacy of considering cash against documents at seaport as the ideal scheme for foreign trade has been exploded.** European nations are in the market, and the necessity of any country engaged in foreign trade, buying as well as selling, has taken hold. Foreign trade consists essentially of buying and selling. You cannot have it unless these two factors are present. It is not possible for any country to be unto itself any more than it is possible for any man to live unto himself, for any family to live unto itself, or for any community to live unto itself.

Profits are an essential of foreign trade, but need not be the motive. There can be no real development of any nation unto itself. Under such a condition retrogression will start.

As an example, witness certain interior provinces in China which for nearly 2000 years have lived unto themselves and to-day are not as far advanced as at the birth of the Christian era.

A still further necessity for foreign trade is that the natural resources of the world must be united before they can best serve the world. As this is accomplished through foreign trade, the general level of nations will rise slowly during the year. Foreign trade is essential to the intellectual development of the people.

How long credits will increase foreign trade was suggested by W. C. Redfield, president of the American Manufacturers' Export Association, who said that he knew of orders waiting for \$20,000,000 worth of American goods to be sold in the foreign field just as soon as extended credit under the Edge act could be established. The machinery for extended credit is one of the prime requisites of foreign trade. It is impossible for the United States, with a file and saw as its tool equipment in foreign trade, to compete against European nations which have modern machinery for financing their foreign trade. Redfield declared that we have reached the end of our financial power in export trade and unless something is done by way of improving the machinery for financing this trade, we have reached the top of our foreign trade. A British exporter, continued Redfield, can go to five or six places and obtain credit for one to six years on export goods.

#### Senator Edge Speaks

Senator Walter E. Edge of New Jersey, father of the Edge law, establishing debenture banks by which long-term credits in foreign trade are possible, speaking at the annual dinner at the close of the convention, urged the establishment of confidence at home and the extension of credit to the foreign buyer as the best method of stimulating domestic production. He re-echoed the words of Governor Harding of the Federal Reserve Board when he stated that national prosperity is dependent on pro-

duction in industry and that the first medicine for the buyers' strike must be confidence, and for the foreign situation it must be the provision of credit and the transmutation of that credit into dollars to pay American producers and labor and agriculture. The foundation of all business is confidence and credit is the cornerstone. There can be no confidence among the people while uncertainty prevails as to the nature of the remedies to be provided for the present uncertainty and apprehension.

Senator Edge believes buying power exists both at home and abroad and that this can be stimulated at home by a return of a confidence that can be brought about only by a realization that men can develop, can make a reasonable profit on their enterprise and then retain that profit. The foreign market can be stimulated by an extension of credits, and the nations seeking to buy have the necessary security to protect such credits. With the Webb Act, legalizing combinations for export business, and the Edge Act, providing for extended credits, American industry has the necessary facilities for foreign trade.

#### Foreign Investments

American investors will have to be educated to the advantages of foreign securities much as the investing public of European countries were previous to the war, according to George R. Meyercord, president of the Illinois Manufacturers' Association, who declared that millions of dollars' worth of export business is at present being lost to America because of our attitude toward foreign investments. If this prospective trade was written into orders many of our idle factories could operate at capacity.

Under the Foreign Trade Financing Corporation the American investing public, which now loans vast sums on the security of a farm, a house or factory, will place its money abroad with more security than the mortgages just referred to. Back of the debentures will be the huge capital guaranty, and back of that again in each case will be the large variety of collateral which will, in the aggregate, create a law of averages that will be so certain to insure repayment to the corporation as to make the risk infinitesimally small to the investors.

Meyercord cited numerous examples of how foreign trade is being lost to-day because of inability to handle credits such as can be handled when the Foreign Trade Financing Corporation is operating. One example was that of a total order of \$20,000,000, consisting of fifteen different varieties of merchandise, which order could not be accepted, due to existing banking conditions. Another example was that of a large pulp and paper company in Scandinavia desiring to purchase \$500,000 of logging machinery. This company was willing to store enough of its manufactured product to guarantee ample security if the necessary credit could be established. The order was lost. Another example was that in which the proposed purchaser was a Scandinavian municipality. The city offered as security for credit city bonds and tax warrants, due six to nine months later. The amount of the tax warrants were many times in excess of the amount of the purchase. It was not possible to give the nine months' credit necessary and the purchase was made in other countries where such credit was obtained.

Frank H. Taylor, president of the S. S. White Dental Manufacturing Co., expressed the belief that it will be a reflection on us as manufacturers and bankers if we cannot get together and establish some machinery for international trading. Our customers in foreign lands need our goods and cannot pay for them to-morrow or the next day, and they have a right to ask for long credits

because we have become a creditor nation and should be able to give them financial assistance. Foreign credits must not be granted by chance, and it is our responsibility that a stabilizing plan be set up to regulate such.

As to how lack of credit is affecting the export lumber situation, J. J. Donovan, vice-president of Bloedel-Donovan Lumber Mill, said that under present conditions the foreign buyer is required to furnish a letter of credit to accompany his order, which means that his credit has to be such as to enable him to pay for the cost of the cargo two, three or four months before shipment, which would mean four or five months before delivery is made to him in the foreign port. He must also pay freight in cash not later than the delivery of the cargo, which is another restriction to trade. America has the lumber to sell, the world desires to buy lumber, the buyer is solvent, but has neither cash nor goods immediately available for payment. His record for honesty is good. He has paid in the past, he will pay in the future. How can we tide over the present? The banker must come in to provide for continuance of necessary business by arranging credits which his reserve capital warrants. It is a question of credit for these foreign firms of established reputations. Without these credits business stops. A better understanding of the problem of credit will revive trade.

#### Legislation

As to how American foreign trade is being hampered in certain portions of the world by unfavorable legislation the present situation in China is an example. Our present Revenue Act of 1918 requires American citizens doing business in foreign countries to pay the same income taxes that are paid by resident citizens. This is working as a serious handicap on our foreign trade in that rival countries, such as Great Britain, do not require their nationals engaged in trade in other countries to pay such taxes. The British merchant resident in practically every port and market of the world has been encouraged by the government, and his freedom from home taxation has been an important factor in putting British overseas commerce into its commanding position. A more specific example of the hardship worked on American merchants resident in other parts of the world is that of the American citizen doing business in the Philippine Islands. He is required to pay his income tax to the United States, whereas the merchants of other countries resident in the islands are relieved from such. Very frequently this tax represents the difference between success and failure, and if such tax could be put into a reserve fund, as is done by the nationals of other countries, American commerce would benefit materially. The importance of this in the Philippines will be clear by an example:

On an income of \$600,000 the United States income tax is \$375,190. The Philippine income tax, which a national of another country would have to pay, is \$77,735. This means a difference against the American merchant of \$297,455. On an income of \$100,000 there is a tax difference against the American merchant of \$24,205. No American can establish a business in any foreign country to-day without facing a fact that the disadvantage worked on him by this income tax requirement may nullify his efforts and leave him at the mercy of his more fortunate rivals.

In connection with this handicap on the American merchant resident abroad it should be borne in mind that the Philippine Islands front directly on China, which is considered by many to be the greatest field in the whole world for commercial development. The Port of Manila has one-half of the population of the globe

within a radius of 3000 miles, and there are many of the big centers of the East, such as Singapore, Hongkong, Shanghai, Yokohama, etc., etc., within a radius of 1500 miles, or a five-day sail.

Daniel R. Williams of the American Chamber of Commerce, Manila, declared that unless the discrimination worked by the Revenue Act of 1918 against our merchants in the Philippines is promptly and effectively relieved, the inevitable consequence will be to paralyze and destroy what we have already accomplished in the islands and render abortive every project formulated or in prospect for the future.

The serious character of the Revenue Act of 1918 is that it falls on Americans doing business there, while Filipinos, British, Japanese, Germans and trade rivals of every other race and color are not so taxed. As these latter pay no tax to their home governments on their Philippine income, it results that in our own dependencies and under our own flag we penalize our countrymen in favor of foreigners. Further, Americans in the Philippines have no voice or participation in the enactment of our laws, and taxing them for the benefit of the home government is not without analogy to certain events connected with the early history of our country when Great Britain attempted to impose certain stamp acts on the colonies.

A sentiment favorable to having Congress pass what is known as the China Trade Act of 1921 was expressed by the convention. J. B. Powell, Shanghai, in mentioning the necessity for the passage of this act, showed how an American merchant desiring to do business in China must organize a company under the laws of one of our forty-eight states, which laws are not satisfactory for such a purpose.

#### A \$500,000 Handicap

The case is similar to that of taxation in the Philippines. A case in point being that of a Boston concern, doing business in Shanghai, paid \$500,000 in taxes to the United States in two years, whereas rival British concerns did not have to pay \$1 to their respective governments during the same period. We have to-day a good American selling personnel in China, and the China Act is designed to place United States nationals on a basis of equality in the matter of trade with the nationals of other countries doing business in China. During the war we increased our trade with China from 6 to 17 per cent, but now that European countries are back in the field there is grave danger that our trade will fall back to 7 per cent unless Congress passes legislation such as the China Act.

At present 67 per cent of the total foreign commerce of the Philippine Islands is with the United States, but there is no reason why this should not be 95 per cent, according to the wishes of the natives, if due regard is made for trade requirements. The Filipinos have a feeling that American citizens resident in the United States should invest in Philippine bonds, such as those needed to improve the Port of Manila. There is objection on the part of the Filipinos to certain trade restrictions on products of the Philippine Islands, particularly as the Philippine legislature has no voice in tariff relationships between the islands and the United States. This function rests entirely with Congress, which is considered highly unfair by the Filipinos. There is a strong demand for the restoration of normal exchange with the islands, as well as a demand for long credits until conditions become normal. The putting in commission of several ships between our Pacific Coast and the islands during the past year had a favorable influence on trade, but unfortunately at the present time the cable between the

islands and the United States is not working and messages are sent by way of Europe.

#### Merchant Marine

A serious situation in connection with our foreign trade was voiced by James A. Farrell, chairman of the National Foreign Trade Council and president of the United States Steel Corporation, as the future of our merchant marine. He said that serious consideration must be given the problem of maintaining it under present handicaps. The steel ships constructed by the Shipping Board are as good as those built by any of our allies, he said, but constructive legislation must be enacted if we are to benefit by these ships as we should. Farrell declared a serious error was made in 1919 by the Shipping Board not disposing of a large portion of the fleet at prices bearing a fair relation to moderately depreciated cost.

An opportunity to realize at least \$800,000,000 was lost, this sum representing the difference between the value the ships that might have been sold at that time and their value to-day. It is questionable whether under present conditions any part of the merchant fleet could be sold to-day except at a sacrifice.

He recommended laying the ships up rather than making such a sacrifice, and declared that the United States should never again be placed in the position of being without sufficient ships to support its army and navy. There is too much ocean tonnage at present, and Farrell recommended an international laying-up of ships program on the basis of relative percentage of tonnages owned by the different nationals.

As a direct bearing on our foreign trade, Farrell urged American exporters to ship by American ships, even if the cost is higher than on ships of other nations. He urged American exporters of bulk commodities to sell their goods on a cost-insurance-freight basis, thereby controlling the ocean freight and allowing American ships a reasonable rate. He did not urge this as an appeal to patriotism but an appeal to reason, since our producers cannot know their markets, nor the laid-down parity of their competitor's prices unless they include in their sales price the cost of their goods, the insurance and ocean freight to the ultimate destination. It is up to American producers to support our shipping in this crisis. It will be necessary to repeal the navigation laws which are not only strangling our ocean-going shipping but affecting our carriers on the Great Lakes. One of these laws requires the engine room crew on an American freighter to be 30 per cent larger than on the steamships of any other nation. The extra cost of labor on an American ship represents 5 per cent more on the capital investment than the labor on ships of other countries.

#### Exchange

Exchange, which is an important factor in foreign trade, did not receive so much attention at the convention this year as last, due largely to the fact that it is a more definitely known factor to-day, whereas it was largely speculative, so far as a solution was concerned, a year ago. Thomas R. Taylor of the Latin-American Division of the Bureau of Foreign & Domestic Commerce, made an elaborate presentation of the exchange situation, particularly with regard to Argentina, Brazil, and Chile, but what he had to say applies equally to practically all of the Latin-American countries. He looks for a rather restrictive market in this field for some time to come, which applies to practically all parts of the world as evidenced by other speakers. The possibility of trade with Europe did not receive any atten-

tion this year, Latin America and the Far East being the centers considered.

Taylor based his entire conclusions with regard to the present situation of Latin-American exchange on three fundamental causes which brought about the present collapse of exchange with these countries:

1. The change from a period of heavy excess of exports to a period of abnormally low excess of exports, or of excess of imports. The change in imports from these countries to the United States is indicated by the following figures; which show the amount in which the imports from these countries into the United States exceeded our exports to these countries.

1913 .....	\$185,000,000
1918 .....	400,000,000
1919 .....	358,000,000

During 1920 conditions reversed themselves and the balance of trade became unfavorable to them. In other words, they were exporting more than they were importing. In the last quarter of 1920 exports from the United States to Latin-America exceeded the imports from these countries by \$69,000,000.

2. The second reason for the collapse of their exchange was that the flow of foreign capital to these countries ceased. Latin-American countries found their exports decreasing because of the sudden cessation of demand caused largely by the inability of Europe to buy and by the world-wide reaction in high prices leading to the so-called consumers' strike.

There was a heavy slump in the price of raw materials exported by these Latin-American countries. Sugar declined from 16 to 10 cents per lb. in the third quarter of 1920; coffee declined from 26 cents to 12 cents in the first half of the year; wheat declined from \$2.58 per bu. to \$1.80 per bu.; wool declined from 59 cents per lb. to 24 cents. This slump in prices together with the decline in volume caused a remarkable decrease in the export trade of these countries.

3. The third cause for the collapse of exchange is given as impaired credit. The currency in many countries has depreciated and in some government finance is not sound. Some of the countries have not yet paid interest charges on their debts. There is little accumulative reserve to fall back on in periods of depression such as the present as Latin-Americans are not a saving people, and much of the money earned easily was spent during 1919 and 1920.

The possibilities for an increased flow of foreign capital to Latin-American countries are fairly good. An American firm has recently closed a contract of \$8,000,000 for the construction of a railroad in Bolivia. Marconi Limited has contracted with the government of Peru to operate the post office, telegraph and radio-telegraph services of the country. We have made loans of \$30,000,000 to the State of Sao Paulo, Brazil, and \$25,000,000 to Chile. Activities of this character indicate an improvement, but some of the countries confront a period of low receipts, and some of them will have a lower credit rating for the next year or two than they have recently enjoyed. The value of exports from these countries will increase on account of the quickened demand in Europe and the United States, which is already apparent, and also because of the large crops in Latin-America just now coming on the market.

#### Unsold Stocks

Although the trade between the United States and Asia increased five fold since 1914, there are in certain countries in Asia great stocks of unsold United States goods in ports due to cancellation of contracts. American importers, resident in China, have been literally swept off their feet and what is known as the mushroom trader and importer of the Far East has gone and stable business considers his elimination a good thing. After the war when there was no demand for our goods in

Asia, belated shipments were pouring into that country in the greatest volumes. At present the markets of China and India are clogged with goods that must be sold at a loss and until these goods are sold the demand for new goods from this or any other country will be small. There are certain signs of improvement in trade with the Far East which will resume slowly. If China were on a gold basis instead of a silver standard, the Shanghai tale which in 1919 was at \$1.22 and to-day is at 62 cents, would it be believed have a more stable character. This unit of value has never been controlled by the government and has always been subject to fluctuation. If the value of silver could be controlled, it would have a stabilizing influence, but there seems little possibility of this. Japan is on a gold standard, and India on what might be designated a gold exchange standard.

Notwithstanding present exchange rate in the Far East, M. A. Oudin, Far East representative of the International General Electric Co., believes the markets of the Far East constitute the world's greatest prize. He said that the number of American firms doing business in the Far East has decreased in contrast with the present activities of English and German firms, at a time when the necessity for aggressive American activity is greater. If American business expects successfully to compete with other nations in the Far East, it must exert itself primarily in three directions:

1—It must freely co-operate with the native business and local enterprises.

2—It must liberally invest its surplus capital in the development of industries, natural resources and public works.

3—It must insist that American economic interests be upheld by an American diplomacy as alert and vigorous as that displayed by other countries.

One way in which investments in China can be handled is through a group of American and foreign bankers known as the Consortium. This Consortium is prepared to loan money to China for public works, including railroads and other national purposes whenever China desires such assistance. The Far East is essentially a battleground on which many nations have engaged and probably will continue to engage in a hard struggle for commercial advantage, and not only must American residents doing business in the Far East be placed on a basis of equality with the nationals of other nations competing for that business, but the necessary arrangements for extended credits must be made.

#### Foreign Advertising

Advertising as a means of securing foreign trade was the subject of one group session. The policy of the home factory directly controlling the advertising copy and practically selecting the mediums in which it is to appear in foreign countries, as compared with leaving the writing and disposition of this copy in the hands of the distributors in the different countries, was advocated by Frederick Dickinson, advertising manager of the Hupp Motor Car Co. In the early days of the Hupp export experience the distributor, no matter in what country he did business, wrote his own copy and selected his own advertising media, and determined the size and extent of the advertising schedule, the factory dividing the expense on a basis of appropriating a definite amount per car shipped. This situation has been discontinued.

Under the new plan, the factory pays the entire cost of its advertising campaign. It makes up the list of publications. The reason for the change of policy was that the company wanted to be sure that the factory's story was being told regularly and steadily throughout the

market and told in its own words. The plan was to guard against misstatements, exaggeration and insufficiency of statement. Although opposition on the part of distributors to this plan was expected, none materialized. The Hupp company is still handling its foreign advertising in this manner, and is satisfied with the plan. The machinery and routine of the work is handled through an agency.

The necessity for studying the psychology of the different nations you are doing foreign trade with was emphasized by Fred Cardway, general manager of the Packard Export Corporation. Cardway is emphatic in the statement that no exporter should attempt to do business in any market until he knows thoroughly its distinguishing characteristics, its peculiarities and its sales potentialities. Psychological truths are independent of time, place or race. Human nature is the same the world over. All men are actuated by the same desires for food, clothing and shelter, so our problem in interpreting the psychology of the races of the world resolves itself into a matter of familiarizing ourselves with the racial surface differences that persist as a consequence of tradition, habit and geographical location. It is for the salesman to trace these varying qualities, these customs, morals, prejudices, fashions and social and national standards back to their source. Having studied these, he is then in a proper frame of mind to approach his prospects.

#### Foreign Trade Education

J. Walter Drake, Hupp Motor Car Co., and chairman of the Export Committee of the National Automobile Chamber of Commerce, Inc., recommended the establishment of a government training academy to be devoted exclusively to the preparation and education of men for the government foreign service. Such an academy would rank with West Point or Annapolis. This academy should have sufficiently large classes at all times to supply the necessary men for any possible demand on its

service. A thorough and intensive course of training, both commercial and diplomatic, should be provided. There would be interchange of duties both before and after entering actual service, so that a man upon finishing his course would have acquired a sufficient knowledge of diplomatic usages to enable him to fill a consular place if necessary. There would be a fundamental training in the necessary requirements to fit the men to meet upon foreign ground the trained experts of other nations.

An academy of this character would do much to prevent the loss to the foreign service of men who through long training and experience have dropped out because of lack of adequate funds to carry on the work. The government foreign service requires special training and capacity in its men, which can only be produced through an academy of this character.

Drake believes that some movement of this kind is needed to correct the situation of to-day. We must come to a quick and full understanding of the fact that a proper and adequate organization of the government service is vitally necessary as a foundation for the new enterprise of the great world trade for which we are actively bidding. As a nation we must recognize and acknowledge the fundamental necessity of foreign trade. There must be built up in this country a public opinion that will force Congress to accept foreign trade as a part of our national policy and provide for its adequate support as for other essential parts of the government program. Diplomacy is inseparably linked with foreign trade. The government should have a foreign service adequate to fulfill its responsibilities for the success of the national enterprise. It is the duty of the government to establish the contact with prospective buyers through diplomatic relations; thereafter through the same means to insure the continuance of an attitude of friendliness and good will that the channels of trade may be kept free. The influence of diplomacy must be exerted from the very beginning and continued to the end.

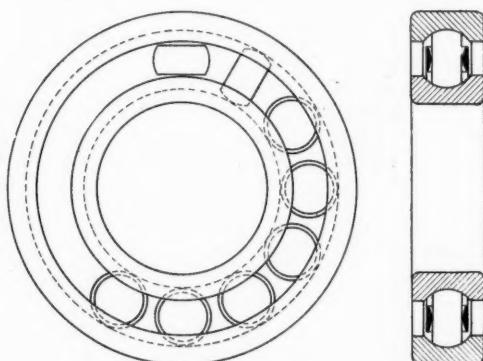
## A New Disk Type Bearing

A NEW Swedish disk bearing for motor vehicle and other purposes has recently been introduced in this country. The disks are not cylindrical but, on the contrary, are central sections of an ellipsoid of revolution. The bearing comprises two race rings provided with grooves in which the disks run. It is possible to completely fill the space between the race rings with disks by inserting the disks with their axes perpendicular to the bearing axis and then swinging them around into their correct position.

One of the advantages claimed for the NKA bearing is that the disks are self guiding, that is, do not require a cage to guide them. A cage is used only because the disks must be held apart in order to reduce the friction. It is obvious from the sectional view of the bearing that a bearing of this type is capable of taking both radial and thrust loads, the latter, of course, to a far greater extent than the ordinary annular ball bearing.

It is claimed that this bearing known as the NKA can withstand as high speeds as an annular ball bearing, and that as the disks have less mass than balls of equal carrying capacity, the centrifugal force on the disks is less. High carrying capacity is obtained in this bearing by reason of the fact that the pressure on the disks is greatest at the center of the disks and very small at the edges, hence there is no tendency for the

Section and side view of the NKA disk bearing, latter showing method of assembling.



edges to become damaged. When the disk bearing is subjected to thrust loads the disk reaction automatically assumes a certain angle which depends on the amount of pressure.

In these disk bearings the grooves of the races and the rolling surfaces of the disks do not have the same radius. The radius of the disk rolling surface is slightly smaller, being so calculated that when the bearing is under full load the entire width of the rollers is in contact with the bearing race. The manufacturers of this bearing are the Northern Ball Bearing Co.

# Germany Reveals Extent of Automotive Exports

Statement issued by official statistical bureau tells the extent of trade for the first eight months of 1920. Figures show that trade reached many parts of the world. Domestic business is much hampered by taxes and operating costs.

By Benno R. Dierfeld

**D**URING the first eight months of 1920 Germany exported 14,024 passenger car and truck chassis. During the same period there were imported into Germany 122 passenger cars and 50 trucks.

This information is contained in the first statement issued by the German Statistical Office on automotive exports and imports. The figures cover the period from Jan. 1, 1920, to Aug. 31, 1920. The figures are not accompanied with descriptions that the American manufacturers would like to have for comparison, but they are done in the method of the German Statistical office.

**Export**—It is regretted that the export figures make no distinction between car and truck chassis and no distinction between a chassis and the complete vehicles. The only information available as to these shipments is the total number of vehicles, the weight and total value. The distribution to the several countries is compared, in the report, only by weight. To this is added an unofficial computation of percentage.

The total exports were 14,024 passenger car and truck chassis, listed at 28,764,500 kilograms, value 883,116,000 marks. A kilogram is 2.204 pounds. Owing to the variations of exchange during the period under discussion, an estimate of the value of a mark is impossible. The point of consignment of the chassis and the weight to each country during the period reported on is as follows:

Country	Kilograms	Per Cent
Belgium	658,100	2.30
Denmark	2,871,900	10.00
France	489,300	1.70
Great Britain	3,272,200	11.40
Italy	131,000	.40
Netherlands	6,025,700	21.00
Norway	1,235,900	4.30
Poland	394,600	1.30
Switzerland	4,160,500	14.50
Spain	5,655,600	19.70
Southeast Asia	520,800	1.80
United States	833,000	2.90
Central America	148,800	.50
South America	563,000	1.90
Other America	597,400	2.00
Other countries	1,206,700	4.30

The percentage of exports to the late enemy countries as shown by this table is interesting, to say the least. In the main, it may be said, that the trade has about followed the lead of the unofficial estimates made recently by American exporters, who have been watching Germany closely. Just what is meant by "Other" American countries after setting forth United States, Central America and South America is not clear.

**Imports**—In the accounting for imports into Germany, the figures are much more satisfactory, but these imports are so small as to be a negligible factor in trade. They are about what might be expected.

Of the 122 passenger car chassis imported, with a total weight of 263,000 kilograms, the division of the trade follows:

Country	Chassis	Per Cent
Austria	78	64
United States	10	08
Other countries	34	28

The 50 motor truck chassis are given a weight of 137,100 kilograms. The statistics are:

Country	Chassis	Per Cent
Austria	15	30
United States	22	44
Other countries	13	26

**Motorcycles**—The motorcycle trade is rather insignificant. The exports were 2839 machines of a total value of 19,657,000 marks. The country of consignment and the number of machines is:

Country	Number	Per Cent
Denmark	531	18.75
Netherlands	893	31.10
Sweden	372	13.30
Switzerland	537	18.95
Other countries	506	17.90

The imports were 17 motorcycles with a weight assigned of 2400 kilograms.

**Parts**—There is no mention of imports of parts during this period and the exports of parts are listed by weight, with no distinction as to kinds of parts or whether for cars, trucks or motorcycles. The total weight of these exports is 1,188,700 kilograms. The countries of consignment and the weight in kilograms follow:

Country	Weight	Per Cent
Belgium	170,800	14.00
Denmark	141,800	11.00
France	77,700	7.00
Austria	55,200	5.00
Poland	5,900	.50
Portugal	1,600	.10
Finland	27,400	2.40
Sweden	239,800	20.00
Switzerland	205,800	18.00
Spain	16,100	1.40
Southwest Asia	3,800	.30
United States	3,800	.30
Central America	3,200	.20
South America	8,900	.80
Other countries	226,900	19.00

**Tires and Tubes**—The exports in the rubber section of the automotive report show that tubes, tires and tire protectors were exported to the value of 36,838,000 marks, with a total weight of 249,200 kilograms. The country of consignment, with the weight to each country, follows:

Country	Weight	Per Cent
Denmark .....	51,800	20.80
Italy .....	10,300	4.20
Netherlands .....	52,500	21.00
Switzerland .....	73,000	29.20
Southeast Asia ....	13,100	5.30
South America ....	15,400	6.20
Other Countries ...	33,100	13.30

The imports are listed differently. First come 56,876 air tubes with a weight of 119,400 kilograms. The country of origin and number of tubes are:

Country	Number	Per Cent
Belgium .....	12,200	21.50
France .....	20,072	35.30
Great Britain .....	3,896	6.85
America .....	16,485	28.99
Other countries ....	4,223	7.36

Next come tire casings, of which there were 95,158 with a weight of 446,700 kilograms. The country of origin and the number of casings follow:

Country	Number	Per Cent
Belgium .....	19,083	21.01
France .....	18,209	19.12
Great Britain .....	10,744	11.30
United States ....	11,326	11.32
Other countries ....	35,796	37.25

These figures appear to reflect Germany's position as to raw materials for tires at the end of the war. It must be remembered that German tire exports before the war were a considerable amount.

#### Domestic Trade Retarded

The German automotive industry is practically without hope of important domestic business in the near future. This is partially due to the present 15 per cent sales tax, which operates double on the exchange of a used car for a new one, as the sale of the used car is taxed also. This has practically ended the exchange sales, for in the case of a trade of a used car on the basis of a \$500 value, for a new car of \$3000 value, the tax on the deal would be on a \$3500 transaction.

In addition to this there is the severe wheel tax and the high price of fuel to be considered. Dealers also anticipate a very heavy tax on personal property. It is feared that with all of these taxes on the car, and the additions of heavy property taxes, there will not be much money left for motor cars. The sales tax on the purchase of a large car at present often amounts to 30,000 marks.

It is true that the sales tax law, which was passed as a luxury tax, operates to the benefit of the professional or business use of the car. But the tax collector is taking no chances. His method is to collect the entire amount of the sales tax and then remit parts of it from time to time, as he is convinced that the vehicle is used for the exempt purposes. The difficulty of this is that the physicians and others who would most benefit from this law have a very serious trouble in finding the money with which to pay the tax at the time of the sale.

This sales tax is not imposed on cars sold for export, unless the customer comes to Germany to make the purchase. If the car is bought in person in this country then it must pay the local luxury or sales tax.

Despite this feeling as to domestic trade, the automotive industry is proceeding with plans for an automobile show this fall, the dates being from Sept. 23 to Oct. 2. This show will be held in the large building erected in 1914 by the Automobile Manufacturers' Association and the Automobile Club of Germany, especially for a show that was planned for the fall of that year but which was not held because of the outbreak of the year. The building is a one-story structure, especially planned for industrial exhibitions and has a floor space of 20,400 square yards and is the largest exhibition hall on the continent. The show regulations as announced in part are:

As exhibits, only products of German firms, having their residence in the German empire, shall be permitted.

The announcements are to be delivered until May 15 at the Geschäftsstelle der Ausstellung (show office), Berlin, W. 9 Leipziger Platz 16. Announcements coming to hand later are taken into consideration, too, if space is available. However, for such announcements an additional rental of 25 per cent is required. The rent for a show stand, including the uniform stand equipment, is 500 marks for the square metre area and 250 marks for the square metre wall surface without area. All exhibits are distributed among the stands by lot within the following groups:

1. Passenger cars, shown by automobile factories.
2. Passenger cars, shown by body works.
3. Commercial vehicles of all kinds.
4. Motorcycles (if not shown together with motor vehicles).
5. Material, spare parts and accessories for motor vehicles.
6. Equipment for automobilists, clothing, cars, books, magazines, etc.
7. Special tools and machine tools, used in manufacturing of motor vehicles or their parts and accessories.

It is expected that this show will bring many new models to notice and that it will really show to the public the vehicles with which Germany hopes to compete for the world trade.

#### Ups and Downs of Industry

The story of the German automotive industry since the war is interesting. The second half of 1919 was a period of progress for the industry and in the first quarter of 1920 the industry had set itself for a period of progress, but in March came the reactionary commotion, called here the "Kapp-Putsch," which caused a general economic and political confusion and was followed by a period of depression. To make the situation even worse, it was during this period that the serious change in the rate of marks took place. This financial flurry was accompanied by the rise of prices of cars on the domestic market and the complete loss of the export trade that had been well started.

It was not until September of 1920 that the automotive market again reached a stage equal to that of the end of 1919. During 1919 there had been a fair market for used cars and trucks, mostly army vehicles overhauled for civilian service. But this trade ended with the March break-up of business, and at the end of 1920 there the trade had not recovered. At the close of the year used car prices were about 30 per cent lower than at the beginning of the year and trucks were fully 45 per cent lower than at the end of 1919.

The trend of prices of passenger cars and trucks is well shown in the minimum prices at which a vehicle

can be listed for export for the purposes of collecting duties. The Government committee revises the minimum prices frequently. The Convention of Truck Manufacturers advises as to the prices of trucks. It must be remembered, however, that the prices quoted in these tables are the minimum, applying only to the cheaper cars and trucks of each class. The more carefully manufactured cars are listed at much higher prices. The prices given do not include export duty, but are the office price for an export shipment. Only three sizes of vehicles are mentioned for this comparison. The prices follow:

#### Passenger Car Chassis Value

	Engine Brake Hp.		
	15 Hp.	30 Hp.	45 Hp.
	Marks	Marks	Marks
Jan. 10, 1920	18,000	32,000	41,000
Feb. 4, 1920	31,500	56,000	71,750
May 1, 1920	39,375	70,000	89,687
June 11, 1920	40,000	75,000	95,000
Sept. 3, 1920	37,500	70,000	98,000
Dec. 21, 1920	40,000	77,000	92,000

#### Convention Values for Motor Trucks

	Load Capacity		
	2 Tons	3 Tons	4 Tons
	Marks	Marks	Marks
Jan. 10, 1920	60,000	70,000	75,000
Feb. 4, 1920	80,000	88,000	93,000
May 1, 1920	120,000	130,000	140,000
June 11, 1920	120,000	130,000	140,000
Sept. 3, 1920	102,000	112,000	122,000
Dec. 21, 1920	210,000	112,000	122,000

#### Licenses Are Restricted

Another very serious factor in the matter of sales has been the attitude of the Government toward the issuing of licenses. The owner of a motor vehicle is required to present a good reason why he should use his vehicle. The Automobile Dealers' Association published this estimate of the number of licenses in effect February 1, 1920. The percentages are a comparison with the number of permits in effect January 1, 1920:

Passenger cars	53 per cent
Motorcycles	42 per cent
Trucks	204 per cent

The increase in the number of trucks indicates the development of motor freight transport during the war,

when the railways were required for military purposes. Toward the end of 1920 the number of licenses were increased. While more vehicles are permitted this year, the exact number is not published.

#### Fuel Prices

Fuel prices also have had a retarding effect, as can be seen by the following table of prices:

#### Gasoline-Consumer Prices for 100 Kilograms

	Delivering Firm
German-American Petroleum Co.,	Rhenania, Düsseldorf.
Hamburg.	
	Marks
December, 1919	505.00
January, 1920	510.00
February, 1920	660.00
March, 1920	876.50
April, 1920	800.00
May, 1920	937.00
June, 1920	772.00
August, 1920	745.50
September, 1920	745.50
October, 1920	745.50
November, 1920	761.50
December, 1920	761.50
	590.00
	528.70
	814.00
	956.00
	823.00
	1,062.00
	1,062.00
	804.00
	775.00
	775.00
	793.00
	793.00

#### Benzol-Consumer Prices per 100 Kilograms

	Marks
May 17, 1919, to Jan. 5, 1920	142
Jan. 6, 1920, to May 19, 1920	310
May 20, 1920, to end Feb., 1921	560

The excessive sales tax, 15 per cent on passenger cars, whether the vehicle is a new or a used car, is a severe sales resistant. But this is paid only once, and a more serious factor is the wheel tax levied by the Federal Government. This tax, unlike the sales tax, applies alike to all vehicles, whether used for commercial, professional or recreation purposes. The present cost of operating a car in Germany is shown in the following table, which is accepted in this country as an average of all costs:

#### Operating Costs per Kilometer

	Marks
15 B.h.p. passenger car, without driver	3.00 to 3.50
45 B.h.p. passenger car with driver	7.00 to 7.50
4-5 ton truck with driver	9.00 to 9.50

The existing decrees of the Government have practically excluded foreign cars from the German market.

## A Battery Meter

**A**n instrument which when mounted on the dash of an automobile and properly connected to the electric system shows the operator not only at what rate the battery is charging or discharging, but also the state of charge of the battery, has been placed on the market by the Edward A. Cassidy Co., Inc., under the name of Cell-O-Meter. It is of the same size as an ordinary dashboard ammeter and is designed to take the place of the latter on the instrument board. The connections are the same, except for one extra connection from the Cell-O-Meter to ground.

The Cell-O-Meter embodies two distinct instruments and has a two-part dial. On the left side is the ordinary ammeter scale, showing both charging and discharging current. The right-hand half of the scale, marked "Battery Condition," is divided into three sections; the red section denotes that the battery is nearly discharged and should not be used; the yellow section denotes that the battery is about half charged and is safe to run with,

while the green section shows that the battery is fully charged.

Ordinarily the instrument acts as an ammeter, but by pushing a button on the dial the battery condition indicating mechanism can be brought into action. The instrument evidently operates on the voltage measurement principle. It is claimed that when this instrument is fitted it is not necessary to use a hydrometer. At present the instrument is made in four models and the model to be used depends upon the battery voltage and ampere-hour capacity.



# S. A. E. Summer Meeting Program Includes Many Important Papers

Five professional sessions and one business session, together with Standards Committee meeting will occupy greater part of last week in May, but allow ample time for usual sports and recreation. Aeronautics, highway transportation, research and standardization the important subjects.

**D**EFINITE announcement concerning the time and nature of the several sessions to be held during the semi-annual meeting of the Society of Automotive Engineers at West Baden, Ind., May 24 to 28, has recently been made and is summarized below. The convention will open, as usual, with a meeting of the Standards Committee, which all members and other engineers interested are invited to attend. Many important recommendations formulated by the various divisions of the committee will be considered. In the evening of the same day, Tuesday, May 24, the usual business meeting will be held. This will include a brief address by President Beecroft and election of members of the Nominating Committee.

The morning of Wednesday will be given over to simultaneous sessions devoted, respectively, to Highway Transport and to Aeronautics. The need for Federal legislation and other phases of aeronautics bearing upon commercial air transportation will be considered, while existing types and trends in aircraft engines will be discussed from the standpoint of military and commercial requirements.

Wednesday, Thursday and Friday afternoons and evenings will be given over to sports and recreation, for which elaborate provision has been made. Many members will be accompanied by their wives, and the program of sports includes many events for ladies.

Thursday morning is to be devoted to a general research session, at which two of the papers will contain descriptions of the facilities possessed and methods followed by two research organizations, those of the University of Michigan and the General Electric Co. The two other papers will deal with subjects of immediate practical interest to all automotive engineers. One of these will discuss lubrication, the author, C. W. Stratford, of the Associated Oil Co., being well known because of the extensive research and development work he has conducted in connection with lubricants and lubrication for automotive engines. The remaining paper at this session has been prepared by Herbert Chase of AUTOMOTIVE INDUSTRIES' Editorial Staff and deals in a comprehensive way with Practice and Theory in Clutch Design. Over twenty-five designs of American and British clutches are illustrated and discussed, the advantages and disadvantages of the various types pointed out and the principal design factors outlined.

The Combustion Session, to be held on Friday morning, May 27, will include three papers, at least two of the authors being well known among engineers who have made a study of automotive engines and their combustion processes. Dugald Clerk is prevented from attending the meeting, but his paper, summarizing his notable achievements in gas engine work over a period

of nearly forty years, will be presented in his absence. Harry L. Horning, whose previous papers on combustion chamber design will be well remembered, is to present many interesting facts regarding the influence of combustion chamber shape on turbulence and the effect of turbulence on combustion and engine performance. The physical and chemical characteristics of flame are not generally understood by engineers, though they are important to a clear understanding of combustion phenomena. The paper on Flame by C. A. French should, therefore, be timely and instructive.

The concluding session of the meeting will be held on Saturday morning and be devoted to Fuel Research subjects. The Bureau of Standards will, as usual, contribute valuable information, this time through the medium of a paper on the Elements of Automobile Fuel Economy by W. S. James, with appendices by Dr. H. C. Dickinson and S. W. Sparrow. This paper contains much valuable basic information which should be studied and applied by all automobile engineers. A second paper, showing what can be done in the way of improving the fuel economy of an automobile engine by improving manifold design, is to be presented by George P. Dorris. F. C. Ziesenhein, whose contributions to these columns will be favorably remembered by readers of AUTOMOTIVE INDUSTRIES, will discuss the Development of a High Compression Oil Engine, a subject which he has long been giving intensive study.

The program, except the business and standards committee sessions, is:

#### Aeronautic Session, Wednesday, May 25, 10 A. M.

Mead, G. J. and L. E. Pierce—Aviation Power Plant Development.

Clark, V. E.—Air Transportation and the Business Man.

Philbin, S. H.—Need for Federal Control in Commercial Aviation.

#### Transportation Session, Wednesday, May 25, 10 A. M.

Goldbeck, A. T.—The Vehicle and the Road.

Tilden, C. J.—Transport Engineering Education.

#### General Research Session, Thursday, May 26, 10 A. M.

Hawkins, L. A.—Industrial Research.

Stratford, C. W.—Lubrication.

Chase, Herbert—Practice and Theory in Clutch Design.

Lay, W. E.—Co-operation in Research.

#### Combustion Session, Friday, May 27, 10 A. M.

Horning, H. L.—Turbulence in Theory and Practice.

French, C. A.—Flame.

Clerk, Sir Dugald—Cylinder Actions in Gas and Petrol Engines.

#### Fuel Research Session, Saturday, May 28, 10 A. M.

Ziesenhein, F. C.—Development of a High-Compression Oil Engine.

Dorris, G. P.—Manifold Development.

James, W. S.—Elements of Automobile Fuel Economy.

# New Life for Roadster Body Design

This article describes a typical roadster of the new design brought out this year. It is confined to a seating capacity of two persons and is rather massive in comparison with older designs. The top is permanent, while steps replace the usual running-board. Extra tire is carried in compartment.

By George J. Mercer

THE current year has brought what may be termed a rebirth of the roadster. During the last few years interest in the roadster has been a constantly decreasing factor. Each builder made a roadster to suit his own trade, without much regard to what his competitor was doing. Designers in general seemed to be giving considerably less attention to roadsters than to any other model.

The lack of interest in the roadster can probably be attributed largely to the increased use of the four- and five-passenger touring body. This tended to discount the use of the roadster and to center designing attention on other models.

New types of roadsters which were exhibited first at the New York show this year, however, indicate a new life for this body model. The new designs are strictly limited to two seats in most cases, although three seats are provided in rare instances. This makes the roadster a distinct model and takes it out of conflict with the four- and five-passenger touring models.

A typical roadster of the new type is shown in the accompanying illustration. The principal change from the older roadster models is comprised in the more massive construction and increased comfort of the present models. The sides are high, the seats are low and the height of the seat-back has been increased. Thus the rider is given a genuine sense of being hugged in the seat. The seat close to the floor meets with the approval of those desiring this type of car, since they are usually drivers regarding their car as a sporting as well as a

transportation vehicle. Making the seat-back high is an easy matter, of course, when the seat itself is placed close to the floor.

The rear carrying compartment is made as commodious as possible. The line in the center is almost to the top of the seat-back. It is continued in a generous sweep to cover all the chassis frame, and is free of gasoline gage and filler. The top view shows that the width of this rear end is made to cover the inner line of the mudguards and that there is a wheel house, as with a touring body.

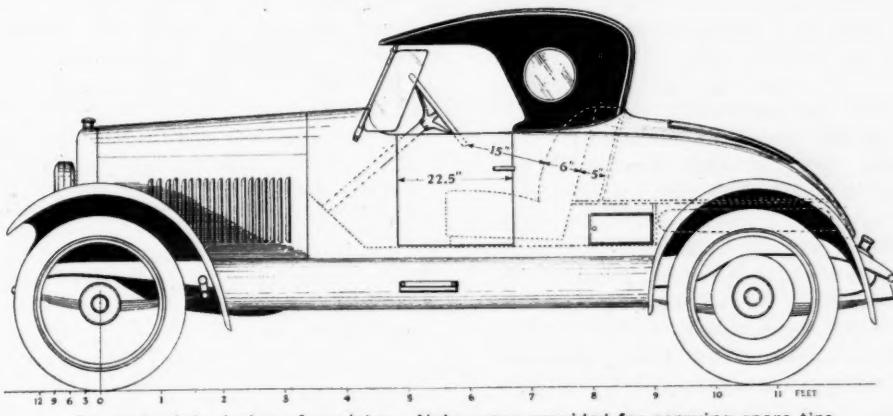
The appearance of this large rear is much better than

one would think when looking at a finished body before it is mounted on the chassis. Formerly the writer favored a rear end the top line of which was nearly horizontal. Now that the width has been increased, however, the line as illustrated presents an excellent ap-

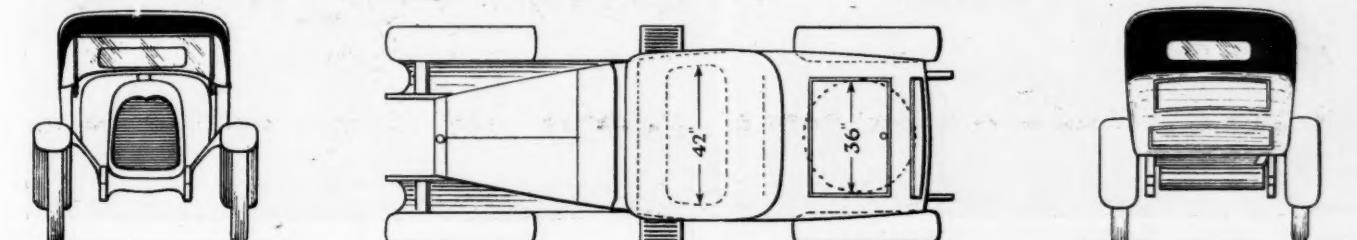
pearance; especially when the extreme back end is wide enough to just lap over the inner line of the guard.

The appearance from the side indicates that the top line of the body side is featured to some extent on the corner of the rear and forms a side panel line to the rear, as indicated. The corner where the top and side sheets blend is of small radius, and, as the top line of the body has a small radius to the outer edge, there is almost a true line from body top to back.

The extra tire is carried usually in supports at the back and in plain view, but where there is abundance of room, as in the design shown, the tire can readily be carried in a compartment. This method gives better



An up-to-date design of roadster. Note space provided for carrying spare tire.



Front, plan, and rear views of the roadster illustrated above and described in the text.

protection all around. The floor, as indicated by dotted lines, is above the tire space, while the door at the side gives access to the small separate compartment forward.

The division back of the seat is similar to that in the average coupe; a loose lid gives access and it is a handy place to carry small parcels. But the primary reason for adding the space back of the seat is for the better appearance of the top. The top is given length from back to front and thereby makes the whole car look lower. It is surprising to note how much improvement is made by the addition of this 6 inches to the length of the top. The space thus provided is convenient for carrying the storm curtain and allows room for parcels as well.

The top in the design shown has been made permanent. We have not yet reached the point of having genuine approval for a stationary top even on touring cars, though it is quite general. But the trend is slowly marching in that direction, for a large number of such cars are used with the top up most of the time. The permanent top has the disadvantage of furnishing increased area for wind resistance, but, on the other hand, the appearance remains good for a longer time. Windshield side wings should be used with a top, as shown. The side window is round, because such construction better simulates a Victoria top feature.

The mudguards shown indicate the general design adopted. On some of the new cars there is a tendency to supersede the runboard with steps. This has been done to a limited extent, of course, for several years, but there are more cars so equipped at the present time than ever before. Several new car manufacturers, not yet hampered by tradition, are using this as regular equipment. For the roadster, steps are ideal, as a better vision of the road is allowed, and the car has more the sport-type appearance than with the runboards.

The shield meets both the front and rear guards, and the step is a large grill, 12 by 14 in. long by 10 in. wide. It is usually a casting of aluminum composition and is bolted flat against the splasher, behind which are brackets supported from the frame.

The doors in the rear compartment are always the cause for disappointment on account of water leaking through when the car is washed. This difficulty is hard to overcome, but a minimum of leakage can be assured if the opening has a combing or lip of the metal projecting  $\frac{1}{4}$  in. above the level of the metal sheet, with the lid or door cupping over this, and with rubber tubing or flexible packing to make the connection tight.

The hinges for these lids are the concealed type, and the spring box lock is generally used.

## Electrically Heated Japanning Ovens

**A**N electrically heated japanning oven which possesses several features of general interest has been installed at the McCord Manufacturing Co. plant.

The oven is of the continuous conveyor type, and is double-decked, having two compartments, one over the other. The work after being dipped is carried on a conveyor through the lower compartment, then back and through the upper, the exit of which is just above the entrance to the first. Both compartments have the same dimensions, 10 ft. 4 in. wide by 5 ft. 10 in. high, by 60 ft. 10 in. long. It is equipped with General Electric Co. heaters, and automatic control, the total connected load being 324 kw. at 220 volts, three phase, 60 cycle. The baking capacity is 3000 lb. of radiator shells, the time being 45 minutes from entrance to exit. The oven is a Young Bros. installation.

The heat is divided into three zones, regulated by automatic control panels located just above the entrance to the ovens (Fig. 1). The lower compartment is equipped with comparatively few heaters, which are concentrated at

the rear end. This gives a preheating zone in the forward end through which the work passes, before being subjected to the maximum heat of the compartment, 250 deg. F. The work is then carried to the upper chamber, which is equipped with heating units for its whole length. The temperature in this compartment is 450 deg. F. which is required to complete the bake.

**A**n interesting explanation of why farm tractors are not built with four-speed transmissions like many automobiles was given in a popular lecture recently. The speaker said that the maximum drawbar pull which could possibly be obtained from a tractor depended upon its weight, and this determined more or less the lowest speed to which it was practical to gear a tractor. At very much higher speeds the tractor had so much unnecessary weight that it became an impractical proposition, and this was the reason that these higher speeds were not provided.



Fig. 1—Lower compartment and entrance end to first heating zone. Continuous conveyor japanning oven. Electric heaters shown in background.



Fig. 2—Upper deck of continuous conveyor japanning oven looking in direction of exit end. Automatic temperature control instrument shown in foreground.

# The Influence of Various Fuels on Engine Performance

## Part III

This instalment of the report on the author's investigations gives definite data regarding the maximum temperatures and pressures at the end of compression which can be used without resulting detonations. The use of inert gas as a diluent to prevent detonation is also covered.

By H. R. Ricardo\*

**I**N order definitely to establish the relative importance of temperature and pressure at the end of compression upon the tendency to detonate, hexane was evaporated in a small steam boiler and admitted to the carburetor. The temperature of the entering gases was then controlled by means of the electric heater fitted in the carburetor air intake passage. When working in this manner it was found that the compression ratio could be raised by 0.1 for every 10 deg. C (18 deg. Fahr.) drop in temperature from 70 deg. C. (158 deg. Fahr.) to 30 deg. C. (86 deg. Fahr.), the corresponding ratios being from 4.8:1 up to 5.2:1.

This test is important, because it establishes a definite relationship between the temperature of the charge and its tendency to detonate. Nor is the issue confused by any question of a further drop in temperature after entry to the cylinder due to the latent heat of unevaporated liquid. So long as no evaporation takes place within the cylinder the temperature of compression at any given speed—and cylinder temperature will always bear a definite relationship to the temperature of the entering fluid over the range of compression ratio explored—the final compression absolute temperature may be taken as approximately 1.7 times the absolute temperature at the commencement.

Thus an increase in the temperature of compression of 17 deg. C. (30.6 deg. Fahr.) necessitated a drop in the compression ratio of 0.1.

If, as is generally supposed, detonation were a function of temperature alone, then the variation in compression ratio corresponding to the variation in inlet temperature would have been nearly five times as great, for the difference between the final compression temperatures at compression ratios of 5:1 and 6:1 is only 38 deg. C (68.4 deg. Fahr.) if the inlet temperature is constant.

These direct, and other less direct experiments, all confirm the statement made previously that the detonation point of a fuel is more closely dependent upon compression pressure than upon compression temperature.

### Relationship Between Detonation Point and Spontaneous Ignition Temperature

It has generally been assumed that the detonation point of a fuel would be dependent upon its spontaneous ignition temperature as determined in air or oxygen.

While, broadly speaking, the results showed that the temperature of spontaneous ignition of a fuel might be taken as a very approximate indication of its tendency to detonate, it was found to be quite unsafe to rely upon this relationship.

Table VI shows the compression ratio at which certain samples were found just to detonate. The table also shows the temperature of spontaneous ignition, in air and oxygen at atmospheric pressure, as determined by Harold Moore.

If detonation were a function of compression temperature alone, then a closer relationship might be looked for between the temperature at which detonation commenced and the temperature of self-ignition. In any event, however, the conditions obtaining in an engine cylinder in which the gases are in a state of violent turbulence are very different from those under which the tests for spontaneous ignition were carried out.

It seemed probable that the temperature of spontaneous ignition of a fuel would form a tolerably true indication of its readiness to pre-ignite, as distinct from the tendency to detonate. This seemed to be borne out in the case of those fuels which pre-ignite without preliminary detonation, such as the members of the aromatic series, methyl alcohol, etc., but the following experiments with mixtures of the paraffin series and carbon bisulphide tended to corroborate this theory. Experiments on the self-ignition temperature of carbon bisulphide when ignited as a stagnant mixture by adiabatic compression showed that this fuel would ignite spontaneously at a temperature of about 275 deg. C. (527 deg. Fahr.). When this fuel was tested alone in the variable compression engine heavy pre-ignition occurred at the lowest compression ratio, and at the lowest inlet and water temperature, with the result that it could not be used at all.

The pre-ignition was, however, unaccompanied by any trace of detonation. When carbon bisulphide was mixed with aromatic free gasoline in proportions up to and even exceeding 50 per cent, it was found to raise the detonation point as compared with that of the gasoline alone. A mixture of aromatic free gasoline and carbon bisulphide in equal parts was found to detonate with a compression ratio of 5.15:1, while pure aromatic free gasoline detonated at a compression ratio of 4.85:1. So far, therefore, as detonation is concerned, carbon bisulphide may be said to have a positive toluene value of about 18 per cent. When running with such a mix-

\*From a preliminary report on research work conducted by the author and other investigators for the Asiatic Petroleum Co. and published in *The Automobile Engineer*.

ture at a compression ratio of 5.15:1 there was no trace of pre-ignition, and it was not until the proportion of aromatic free gasoline was still further reduced that pre-ignition first became apparent.

The inference to be drawn from these experiments is that carbon bisulphide, while pre-igniting very readily, will not detonate, whereas any paraffin gasoline will detonate, but will not readily pre-ignite. Tests carried out on the special machine designed for ascertaining the self-ignition temperature of fuels when ignited by adiabatic compression showed that carbon bisulphide ignited under compression at a gage pressure of about 185 lb. per square inch and a compression temperature of about 275 deg. C. (527 deg. Fahr.), while the aromatic free gasoline ignited under the same conditions at a gage pressure of 320 lb. per square inch and at a temperature of 353 deg. C. (668 deg. Fahr.). The initial temperatures before compression were 15.0 deg. C. (59 deg. Fahr) and 15.6 deg. C. (60.1 deg. Fahr.) respectively.

In the case of those fuels which pre-ignite without preliminary detonation, it was found very difficult indeed to determine the pre-ignition point, because, in practice, this clearly depends largely upon the temperature of the exhaust valves, sparking plug electrodes and other insulated parts within the combustion chamber. As might be expected, variations in the design, or in even the condition of the sparking plug, exerted so great an influence upon the tendency of the fuel to pre-ignite as to render anything more than a very approximate determination impossible.

It is hoped, later on, that the results of tests of the spontaneous ignition temperature and pressure, when both temperature and pressure are raised by the adiabatic compression of a stagnant mixture, will be sufficiently advanced to enable them to be fully dealt with, and their relation to the detonation point shown.

It may be argued from the test results given that so far as existing engines are concerned, no advantage would be obtained from the use of a fuel of high toluene value, because very few engines, other than aircraft, have a compression ratio as high as 5:1 which in the variable compression engine requires a toluene value of only 5 per cent.

It must be remembered, however, that in this engine every effort has been made to reduce detonation. The form of the combustion space is the most efficient practically obtainable. The charge is ignited from two points at opposite sides of the combustion chamber, and the time of the passage of the spark perfectly synchronized. Turbulence of the charge in the cylinder is at a maximum, and there are no pockets or recesses where unburnt gas can become entrapped and detonated.

Finally all comparative tests were run at a speed of 1500 r.p.m. corresponding to a piston speed of 2000 ft. per minute.

In the ordinary car or commercial vehicle engine these ideal conditions do not apply, but on the contrary the combustion chambers are in many cases so designed as to encourage detonation. Check tests were from time made on various standard engines on different test beds at the laboratory. One engine, designed and built by one of the best known makers of commercial vehicle engines, afforded an excellent illustration of the effect of combustion chamber design upon detonation. Had the designer of this engine set himself the task of trying to induce detonation, he could hardly have been more successful. This particular engine had a compression ratio of 3.95:1, corresponding to a compression pressure of only 78 lb. per sq. in., yet the engine detonated alarmingly even on a fuel of toluene value 10 per cent, while the variable compression engine using the same fuel would run perfectly smoothly, and at maximum efficiency,

Table VI.

Fuel	Specific Gravity at 15 Deg. C. (59 Deg. F.)	Detonation Point in the Variable Compression Engine			Self-ignition Temperature as Determined by Adiabatic Compression with Air		Self-ignition Temperature at Atmospheric Pressure as Determined by Moore		G
		Com- pression Ratio	Com- pression Pressure (Lbs. per Sq. In. Gage)	Com- pression Temperature Deg. C.	Deg. F.	Deg. C.	Deg. F.	Deg. C.	
Aromatic free gasoline	0.718	4.85	105.5	392	738	253	668	—	—
"A" gasoline	0.782	6.0	148.5	430	807	367	693	—	—
"B" gasoline	0.723	5.7	133.5	422	792	—	—	—	—
"C" gasoline	0.727	5.25	118.0	407	765	—	—	—	—
"D" gasoline	0.760	5.35	121.5	410	770	—	—	—	—
"E" gasoline	0.719	4.7	100.5	387	729	—	—	—	—
"F" gasoline	0.704	5.05	111.5	400	752	—	—	272	521
"G" gasoline	0.750	4.55	96.0	381	718	—	—	383	722
"H" gasoline	0.767	5.9	140.5	428	803	—	—	—	—
Heavy aromatics	0.885	6.5	163.5	438	820	—	—	—	—
Kerosene	0.813	4.2	86.0	369	696	—	—	252	485
<i>Paraffin Series</i>									
Hexane, 80%	0.685	5.1	113.5	401	754	366	691	—	—
Heptane, pure	0.691	3.75	72.0	353	668	330	626	—	—
<i>Aromatic Series</i>									
Benzol, 98%	0.884	6.9*	179.0*	450*	843	419	787	566	1050
Toluene, 99%	0.870	>7.0	>183.0	>452	844	422	792	516 (90%)	960
Xylene, 91%	0.862	>7.0	>183.0	>452	844	—	—	484 (Coml.)	904
<i>Naphthene Series</i>									
Cyclohexane, 93%	0.786	5.9*	140.5*	427	800	387	729	—	—
Hexahydrotoluene, 78%	0.780	5.8	136.5	425	797	378	713	—	—
Hexahydroxylen, 60%	0.744	4.9	107.0	394	741	—	—	—	—
<i>Alcohol Group and Miscellaneous</i>									
Ethyl Alcohol, 98%	0.798	>7.5	>204.0	>424	795	514	959	518	965
Methyl alcohol (purified wood naphtha)	0.829	5.2*	116.5*	342*	648	457	855	—	—
Methylated spirits	0.821	6.5*	163.5*	382*	720	—	—	—	—
Ether	0.735	2.95	47.5	305	581	256	494	190	374
Carbon disulphide	1.270	—	—	—	—	275	627	—	657

*Notes.*—The sign \* denotes that the value given for compression could not be exceeded owing to pre-ignition occurring before audible detonation.

*Column D.* The compression temperatures given in this column are calculated, taking into account the fall or rise in temperature due, respectively, to the latent heat of evaporation of the fuel on the one hand and a constant heat input of 65 B.T.U.'s per minute on the other.

*Column E.* The figures given in this column are the temperatures at which samples of the fuel were found just to ignite spontaneously when a mixture of fuel and air of a strength to give complete combustion was suddenly compressed, without initial turbulence, the ratio of compression being adjusted until self-ignition just occurred. This machine, which will be described later, has only recently been brought into operation and some uncertainty still exists as to the true value for the exponent of the compression curve. There is no reason, however, to doubt the relative accuracy of these figures.

*Columns F and G.* The figures given in these columns are taken from Harold Moore's paper on the Spontaneous Ignition Temperatures of Liquid Fuels for Internal Combustion Engines read before the Society of Chemical Industry, December 1st, 1916.

with a compression ratio of 5:1. To enable the particular engine referred to to run smoothly on any fuel having a toluene value of less than 20 per cent, it was necessary to employ an over rich mixture and to considerably retard ignition, sacrificing both power and economy.

It is estimated that the majority of engines now in use can run at the maximum efficiency on a fuel of toluene value of from 15 to 20 per cent.

In the summer of 1919 the Shell Marketing Co., realizing that the existing methods of specifying the quality of their motor spirit by determination of the specific gravity and boiling-point range, while affording useful information in certain respects, were of minor importance compared with toluene value, inaugurated the system of so blending their shell spirit as to give a high uniform toluene value. During this period a census was taken of the experience of fifty users of a total number of nearly 200 cars and commercial vehicles. An analysis of this census showed an average increase in the mileage per gallon of no less than 17 per cent as compared with other brands of gasoline, while over 80 per cent of the users canvassed volunteered that they noticed a very marked increase in power on hills, due clearly to the fact that absence of detonation enabled them to run at slow speeds with an efficient ignition timing. Guided by these results, the Shell Marketing Co. have determined to maintain a definite toluene value standard for their Shell spirit, and they now always blend this brand with this object in view.

This practical experiment proved strikingly that it is the tendency of a fuel to detonate, which in practice controls the efficiency and power output obtainable from it, even when it is used in the relatively low compression engines such as are general to-day.

Tests carried out by the Royal Aircraft Establishment and most of the manufacturers of aero-engines have shown also that both the power output and economy of aero-engines can be increased by the addition of benzol to fuels of low toluene value, not because it contains greater internal or potential energy, for, as will be shown later, it does not, but simply because the addition of benzol checks the tendency to detonate and so permits of the more efficient use of the fuel. The Air Ministry's existing specification for an aircraft spirit insists upon a gravity and boiling-point range which limits the toluene value to from 12 to 14 per cent, and necessitates a low aromatic content for the fuel. Such a fuel will cause violent detonation in some of the most important existing aircraft engines. The aromatic content, therefore, is often raised by the addition of benzol, which is composed chiefly of benzene and which, curiously enough, is the heaviest and least effective member of the aromatic group. Such a state of affairs illustrates how little the essential characteristics of a good fuel were understood.

It will be shown later that, compared with the question of detonation, all other considerations and differences, in so far as they control the power output and efficiency, sink into insignificance.

Certain rigid requirements must, of course, be fulfilled. The fuel must contain at least a minimum proportion of highly volatile constituents with a high vapor tension in order to facilitate starting; these, however, can be added to any fuel, and need not influence appreciably its toluene value. Again, the final boiling point must not be so high that liquid fuel will condense upon the cylinder walls, and so ultimately find its way into the crank chamber. These and other points will be dealt with later on, but it is well to emphasize at this stage that, compared with the tendency of a fuel to detonate, they are of secondary importance.

In the course of the investigations upon the subject of detonation certain other experiments were tried, some of which are of sufficient interest to be worth recording.

Since detonation is presumably a function of the rate of burning of a fuel, experiments were carried out with a view to ascertaining how far the efficiency could be improved, when the rate of burning was controlled by means other than varying the composition of the fuel. For this purpose the addition both of cooled exhaust gases and of water was employed.

It was found that by the addition of cooled exhaust gases to the standard aromatic free petrol, detonating normally at a compression ratio of 4.85:1, the compression could be raised up to 7.5:1, or even higher, without detonation or pre-ignition. This increase of ratio corresponded to an increase of compression pressure of from 105 lb. per sq. in. to 203 lb. per sq. in. gage. In these tests the variable compression engine was run up on the standard aromatic free gasoline, until all con-

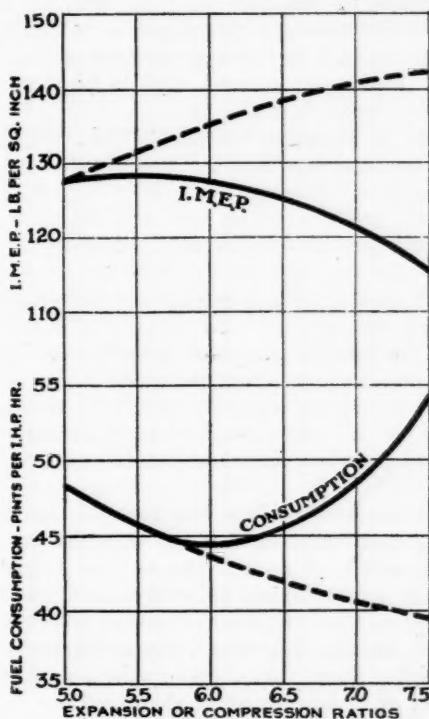


Fig. 7  
Full line curves show the results with a fuel of low toluene value with cooled exhaust gas added. Dotted lines show the corresponding values of I.M.E.P. and of fuel consumption for a fuel of high toluene value requiring no dilution with inert gases

ditions had become normal. The compression ratio was then raised till the detonation point was reached, when readings of torque and fuel consumption were taken, the mixture strength being adjusted until the most economical proportions had been found. A cock admitting cooled exhaust products to the air intake of the carburetor was then slightly opened and the compression raised until detonation again became apparent, when readings of torque and fuel consumption were taken at the higher compression ratio. The procedure was repeated at frequent intervals at compression ratios ranging up to 7.5:1, in each case just sufficient exhaust gas being admitted to check detonation. The results obtained are shown in Fig. 7, in which the full lines show the torque in terms of indicated mean pressure and the dotted lines show the torque obtained without exhaust gas added, at the same compression ratios and with a fuel of the same

energy content but of sufficiently high toluene value to withstand the highest compression. The divergence between the two mean pressure curves indicates approximately the proportion of exhaust products required to check detonation at each compression ratio for aromatic free gasoline. The lower curves show, in full lines, the fuel consumption in pints per i.h.p.-hour, with the exhaust gas added, and in dotted lines, the consumption obtained with a fuel of exactly the same calorific value per pint, but of sufficiently high toluene value to need no exhaust gas added.

It will be observed that in spite of the addition of inert gases, the net power increases with the increase of compression up to a ratio of 5.5:1. This is due clearly to the higher efficiency of the "air cycle." Above 5.5:1 the quantity of inert gas required to check detonation more than balanced the improved efficiency due to the greater expansion ratio, and the power output declined again. The economy increased with increase of compression up to 6:1, in spite of the high specific heat of the exhaust products, but above this compression it declined rather rapidly, due in part to the rapidly increasing proportion of exhaust products required, and in part no doubt due to incomplete combustion.

Similar tests were carried out using steam in place of cooled exhaust gases. The results obtained were generally similar in characteristics. It is hoped to carry out further tests with nitrogen and carbon dioxide.

The results given are interesting in that they indicate clearly:

- (1) That under normal conditions pre-ignition, in the case of ordinary gasoline containing a substantial proportion of members of the paraffin series, is always brought about by persistent detonation.
- (2) That if detonation be prevented, pre-ignition will not readily occur, even though the compression pressures be raised to double that permissible under normal conditions.
- (3) That detonation is a function of the normal rate of burning, and that if this be delayed by employing inert gas to act both as a brake and as a cooling agent, much higher compression pressures can be used.

Another experiment, also of some interest, was carried out in order to determine the compression pressure at which detonation takes place when a high compression is used and the engine is throttled.

#### Experiments with Compression Varied by Throttling

For these tests the same standard aromatic free gasoline was used, and after preliminary running at full throttle, the latter was partially closed, and the compression ratio raised to say 5.5:1. The throttle was then very gradually opened until detonation just became apparent, a reading of torque was taken, the throttle was locked securely in position, and the supply of fuel cut off; the engine was then driven by a motor at the same speed, and the actual compression pressure recorded by means of a modified form of Okill indicator, which was found to give very accurate readings. The same procedure was repeated at a number of different compression ratios varying up to 7.5:1, and the results obtained are as shown in Fig. 8.

The full lines indicate the observed results with varying throttle opening, and the dotted lines show what would have resulted if the fuel had permitted of full open throttle being used at all compressions. It will be observed that while under these conditions of throttling the indicated mean pressure, and therefore the power output, naturally falls very rapidly, the actual compression pressure at which detonation first became apparent is nearly constant. Owing, however, to the relatively

small proportion of charge taken in at the higher speeds, the proportion of exhaust gases in the mixture is slightly greater at the higher compression, and this no doubt accounts for the fact that the pressure at which detonation commenced is higher at the higher compression ratios, instead of slightly lower as would otherwise be expected due to the higher compression temperature.

As a practical and ready means of determining the toluene value of a fuel, it is interesting to note that the new aniline test employed by chemists for determining the aromatic content of a fuel responds also to the naphthalene content, and therefore this test affords a fairly accurate measure of the tendency of the fuel to detonate. The reason for this is shown by reference to Table III (which was printed in the preceding article on this subject), giving, for various fuels, their observed toluene values and also their approximate compositions. It may be seen from this table that the average toluene value of the paraffins present in petrol is roughly — 10 per cent. The average for the naphthalenes is + 30 per cent.

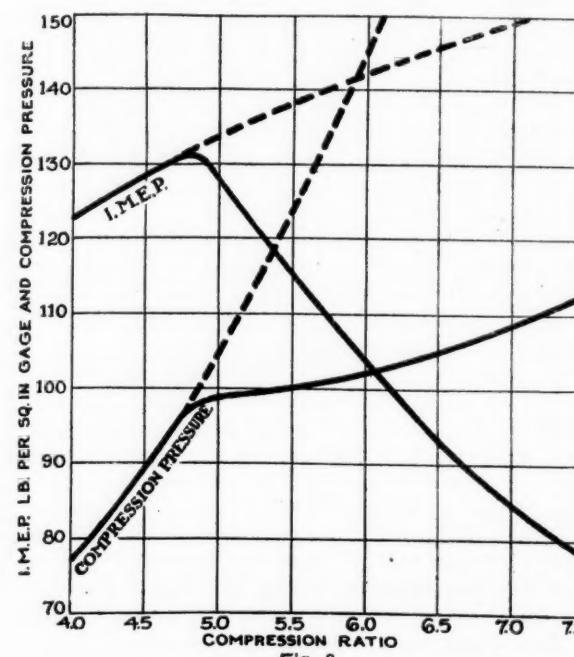


Fig. 8

The full lines show the indicated mean pressure obtained and the corresponding compression pressure (taken by modified Okill gauge) for varying compression ratios, and the throttle closed just sufficiently to prevent detonation of a fuel of low toluene value. The dotted line continuations show what would have been the resulting mean pressures at the various ratios had the toluene value been sufficiently high to admit of full open throttle at the highest compression ratio

The average for the aromatic is + 75 per cent—the toluene value of benzol being 67 per cent, of toluene 100 per cent and of xylene 85 per cent.

Although the results obtained from this series of investigations into the factors controlling detonation permit of certain fairly definite conclusions being drawn, the writer feels that much still remains to be done, for many discrepancies still remain to be cleared up. The following conclusions and inferences may, however, safely be drawn:

- (1) The one outstanding factor, limiting both the power output and the efficiency obtainable from any fuel, is the tendency of the latter to detonate. This controls not only the compression ratio which can be employed, but in most cases it controls also the efficiency at which the fuel can be burnt, even at relatively low compressions.

(2) The tendency of a fuel to detonate appears to be a direct function of its normal rate of burning.

(3) No evidence of any kind has been adduced to show that the normal rate of burning of any fuel can be too low. This point will be discussed further when dealing with the power and efficiency obtainable.

(4) Of all the constituents of natural gasoline the most effective in checking detonation is toluene, followed by the other members of the aromatic group.

(5) Although compared with the other constituents the aromatic series have a somewhat lower calorific value per lb. (but not per gallon), the gain in efficiency due to

their presence, even in quite small quantities, is so large as to render the small difference in heat value insignificant.

(6) The classification of a fuel by its specific gravity and boiling point applies only when the fuel is composed entirely of pure paraffins. No such fuel is, or ever has been, available outside a chemical laboratory.

(7) Any specification for a fuel should be so drawn as to encourage the inclusion of as large a proportion of the aromatic series naturally present in the crude petroleum as possible.

(To be continued)

## Development of Aeronautical Engines by the Army and Navy

**D**EVELOPMENT of certain types of engines by the Army and Navy Air Services has been recently approved by the Secretary of War and the Secretary of the Navy upon recommendation of the Aeronautical Board.

### Class (a)

Of mutual interest to the Army and Navy Air Services.

**50-60 HP.**—An engine of this power is available but further development of this type has been assigned to the Navy Department.

**350 HP. Air-Cooled Radial Engine.**—This engine is placed in this class on account of the maneuverability that can be given to an aircraft equipped with it, reduction in area of vulnerable parts, and a wide range of atmospheric temperature in which it will probably be capable of operating. The development of this engine is now in hand under army cognizance.

**550 HP. Water-Cooled Engine.**—For medium weight heavier-than-air craft. An engine of this type is in process of development in commercial hands. Tests are being conducted under Army cognizance and modifications are being recommended by the Army Air Service.

**700 HP. "W" Type Water-Cooled Engine.**—For heavier-than-air craft of large size. This type of engine is in process of development under Army cognizance.

**1000 HP. "W" Type Water-Cooled Engine.**—For aircraft of heavier-than-air type of extremely great size, now in process of design by the Army Air Service.

Engine to operate on heavy oil fuel, probably about 500 hp. The development of this engine is of mutual interest, in view of the existing fuel situation and in view of the desirability of eliminating, to as great an extent as possible, fire hazards existing in the use of present type aviation (airplane) engine fuels. The development of an engine of this type has been undertaken under Navy cognizance.

**160 HP. 6-Cylinder Water-Cooled Engine.**—This engine is being developed under army cognizance for installation in aircraft used in training. The development of this engine and of the engine noted under class (b) of approximately the same horsepower but of radically different type is being carried on with a view to determining which of the two types is the more suitable for this purpose.

**300 HP. Cannon Engine.**—This engine is being developed under army cognizance, for installation in an aircraft where it is desirable to have a gun firing directly ahead through the propeller hub.

**350 HP. to 375 HP. Water-Cooled Engine.**—For installation in pursuit airplanes. The engine contemplated is of the highest performance type, will be highly stressed, of very light weight, and probably of only moderate durability.

**300-400 HP. 6-Cylinder Water-Cooled Engine.**—Engines of this type are being developed under Navy cognizance for installation in rigid airships, or in large non-rigid airships.

### Class (b)

Engines primarily of interest to the Army Air Service.

**140 to 160 HP. Air-Cooled Engine.**—This engine is being developed under Army cognizance for aircraft used in training.

### Class (c)

Engines of primary interest to the Navy Air Service.

**200 to 230 HP. Radial Air-Cooled Engine.**—This engine is being developed under Navy cognizance as a step toward the development of a durable, relatively cheap engine for training purposes, or for small shipboard aircraft. Its development is desirable for training purposes, since greater powers are needed in aircraft for training than are required by the Army Air Service. Likewise, it is desirable to have available an engine of domestic manufacture of about this power corresponding with certain well-known engines of foreign manufacture, for use in small shipboard and other type aircraft.

**250 to 275 HP. Engine.**—This engine is to be developed for use in a twin-engined airplane or seaplane designed as a torpedo carrier, bomber, or spotting machine. For a twin-engined installation the total power of these engines is approximately equal to that of the 550 hp. engine noted under class (a), but the development of the smaller engine appears to be desirable from considerations of maneuverability and ease of installation in naval aircraft designed as torpedo carriers.

**650 to 750 HP. Water-Cooled Engine.**—The development of a larger type engine for rigid airships appears to be desirable, and at present it appears that 650 to 750 hp. represents the maximum power and weight that are practicable to concentrate in a single unit for this purpose. To be developed by the Navy Department.

**Steam Engines.**—The development of the steam engine is to be continued at once and worked to a definite conclusion as rapidly as possible.

**Geared Engines.**—The Navy is now engaged in the development of the geared engine for use in its aircraft. Detailed development of numerous types is extremely necessary at this time in order that the non-availability of engines of a given type may not prevent the development of types of aircraft of the greatest utility.

The importance and possible value of the development of an internal combustion engine of turbine type is being followed by the War and Navy Departments and there are some indications that increased progress in aeronautics will warrant its development in the near future.

# The Tracking and Steering of Trailers Analyzed by a Graphic Method

## Part II

Factors which affect the steering and tracking of various trailer outfits are further discussed and the graphic method of analysis is applied in concrete cases. Driver's skill in handling equipment is important.

By Marius C. Krarup

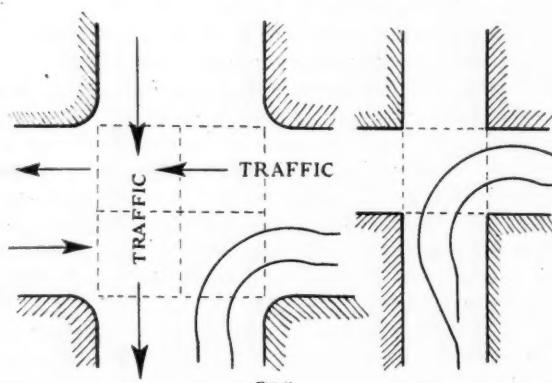
In a comparison of the two systems from a mechanical viewpoint there would be room for other observations, but so far as tracking is concerned they can both be represented by the same diagram, with the understanding that in reality one or the other may be preferable according to the peculiarities and dimensions of the vehicle bodies, the roughness of service, the length of the coupling wanted, the preference for draft from frame to frame or from frame to axle.

The equivalence referred to does not merely permit simplification of diagrams. It also makes it clear that all tracking can be plotted as free trailing after a leading point—the hook or joint—so located in fixed relation to the leading vehicle (or pair of wheels, in the case of four-wheel steering) that it is moved to the outside of the curve to be described, the side opposite to that of the turn. By the use of automobile steering linkage the actual displacement of the leading point can be moderated, as when small overhang of the hook or joint is structurally desirable, and the desired tracking effect nevertheless obtained, but the plotting of the track can be done with a simplified diagram showing the equivalent theoretical displacement. The requirements for easy and rapid plotting of vehicle movements are thus reduced to: Simple diagrams of vehicles and a simple

method for constructing any free-trailing curve. The latter is shown in Fig. 14.

A comparison of city and country conditions, to both of which most trucks and trailers must conform, is illustrated in Fig. 11, with a view to establishing a working idea with regard to the shortness of turn that is required for operating comfortably in normal circumstances. Wider or sharper turns may be preferable at times, but for comparison of different systems for securing whatever degree of tracking is necessary it is obviously best to select a standard radius. Taking city streets to be 60 feet wide, with rounded corners, and the dependable roadbed in the country usually not over 30 feet wide, a turn in the city has only the advantage of the rounded corners over a turn on a country road, assuming that traffic rules normally restrict a turn to one of the four 30-foot squares of the street crossing, while in the country a hauling outfit can normally take the whole road for a turn. On this basis it may be said that the minimum demand to be made of a hauling outfit is ability to turn comfortably and without much reduction of straightaway speed from one 30-foot street or road to another, at whatever front and rear radius for the tractor unit may be found to be required for this purpose, and that preferably the outfit should be capable, with suitable speed reduction, of making such a turn on its own side of the road in the same manner as the truck of 13 feet wheelbase was seen to make it in Fig. 6, with a radius of 24 feet for rear wheels and 27 $\frac{1}{4}$  feet for the front wheels. To conform with the diagrams, radius is taken as the mean radius for the two wheels of a pair.

In Fig. 12 there is shown a turn made with a truck of 10 feet wheelbase drawing a trailer of 15 feet wheelbase, the distance from truck rear axle to trailer front axle being 10 feet and the hook about midway between the axles. The turn is made by a single steering gesture at the beginning and another at the end. The trailer steering may be either by axle steering or wheel steering, the location of the hook representing either form, as explained. The radius of the turn is made 30 feet for the rear wheels of the truck, and the figure shows that with this radius the outfit cannot quite turn the corner on its own side of the road of 30 feet width. The corner of the road is indicated in different locations to make the possibilities clear. One can always hug the side of one of the roads if the whole width of the other road is at disposal, but it is not possible to place the corner so that the incumbrance of both roads will be less than 16 to 17 feet. By forcing the tracking of the rear trailer



There is shown a crossing of city street 60 feet wide and one of country roads 30 feet wide, and it is indicated why the steering requirements must normally be almost the same for both conditions. A wide turn and a close turn are traced in both cases. On the country road (or narrow city street) a trailer outfit must return to its side of the road after a wide turn, while on a wide street it does not leave its own side. The sharp turns are identical, except for the easement from rounded city corners

wheels it may be done, however, even with a turning radius of 30 feet, since the figure shows the hook leading the trailer on a circle slightly larger than the circle of the rear wheels, and the front of the trailer tracking almost exactly with the latter. Nothing but the rear trailer wheels prevent hugging the side of the road more closely.

For comparison the same outfit is shown in Fig. 13 with longer overhang of the hook to track more closely, and making the turn with a radius of 20 feet for the rear truck wheels. And it is here observed that the trailer in this case snakes perceptibly, while in the first instance it was turned only very little to the left at the beginning of the right turn.

It is also noticed that the long trailer wheelbase makes trouble. The trailer body drags into the curve of 20 feet radius worse than into that of 30. The front trailer wheels are turned at an angle that cannot be realized unless the wheels will turn under the vehicle. More diagrams than it is practicable to print here would be needed to demonstrate definite conclusions from these observations and others which Figs. 12 and 13 may suggest. It is useful to remember, however, with regard to all the diagrams that they express a relativity only and are applicable with a change of scale. Figs. 12 and 13, for example, are applicable to shorter vehicles turning with shorter radius on narrower roads.

The matter of greatest interest in the whole subject lies perhaps at present in devising a method by means of which trailer curves can be readily shown on paper for any kind or dimension of outfit and with reference to any width of road that may be of interest. If applicable to the curves produced by backing and maneuvering, it seems evident that such a method can be turned to good account for familiarizing drivers with the results obtained in maneuvering by various steering gestures, since a considerable number of frequently occurring situations could be diagrammed and studied. The fundamental principle for such a method is indicated in Fig. 14, which shows a leading point, A, describing a curve and the curves described by three trailing points, B, C and D, starting from different relations to A, and the manner in which the three trailing curves are constructed. In Figs. 12 and 13 the truck front wheels make a leading point in relation to the truck rear wheels and the hook, the hook a leading point in relation to the trailer front wheels, and the latter a leading point in relation to the trailer rear wheels, but the construction is simplified for a simple and sustained circular turn with a known center and no change of radius. The curve of the leading point in Fig. 14 may be composite and of any degree, and the points, 1 to 14, selected for determination of corresponding points on the trailer curves, need not be equidistant. The data for construction are two, (1) that the trailing point is a given distance from the leading point, and (2) that the trailing point wheel follows a curve to which it can be at every point tangential. From each of the points on the leading curve there is, therefore, described a circle with the distance to the trailing point as radius, and, beginning with the original position of the trailer point, the shortest

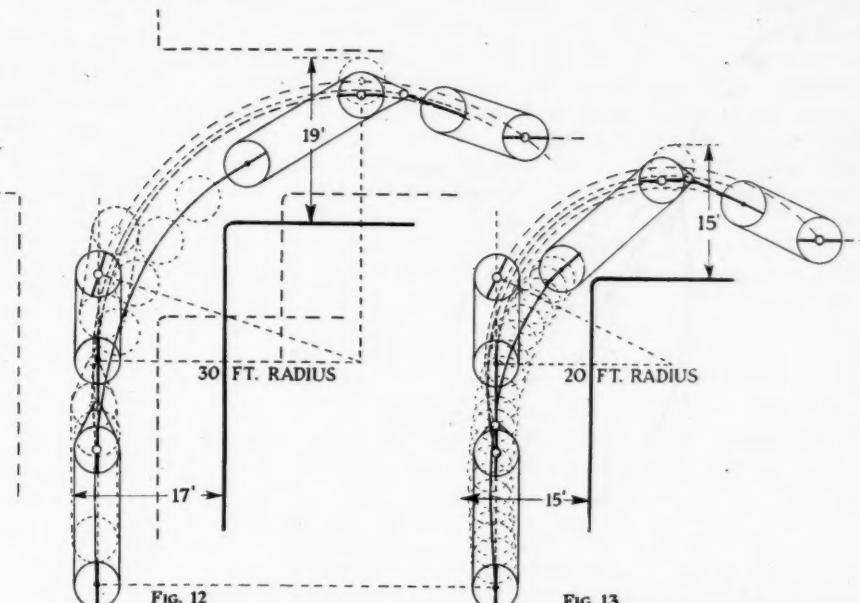


FIG. 12

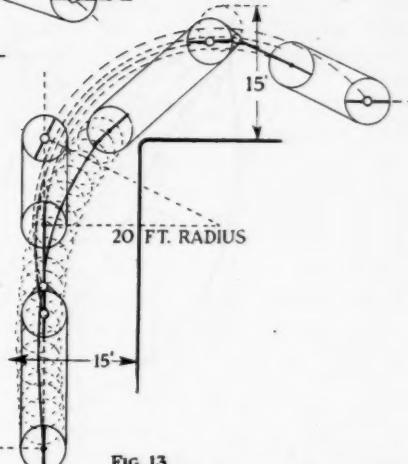


FIG. 13

Turns made with a trailer outfit on a 30-foot road with turning radius of respectively 30 and 20 feet. The outfit is in both cases a truck of 10 feet wheelbase drawing a four-wheel trailer of 15 feet wheelbase, but the overhang of the coupling hook is made longer in the second instance to produce closer tracking. The length of the trailer wheelbase operates to the contrary, however. Snaking effects appear plainly in the diagram of the sharper turn. By considering the corner of the road for different locations, as indicated in broken lines on Fig. 12, an idea can be formed of the best place to begin a turn for different conditions of traffic, or when the question is of turning from one road to another of different width, the expedient of moving the corner on paper being applicable to any diagram drawn. Some trailers of 15 feet wheelbase will not be able to make the sharp turn in Fig. 13, because their front wheels cannot be turned to an angle as large as that here required

course from one point on the trailer curve to the next one is determined by a tangential arc from the already determined point on the trailer curve to the distance circle for the next one. In practice it is more satisfactory to make the arc intersect the distance circle at two points close together and draw the trailer curve midway between the two points of intersection. A straight line from any given point on the leading curve to the corresponding point on the trailer curve will be found tangential to the latter in all cases, but these lines are not shown here.

The construction approximates geometric accuracy in the measure as the spaces on the leading curve are reduced in length by increasing the number of construction points. If not enough are used, the trailer curve slips inward a little, but slip of very similar nature occurs in reality on the roads, because the drag, due to traction resistance, tends to flatten every curve a little, especially where the turns are sharp.

In this diagram the leading point, A, may be taken as representing the front truck or trailer wheels in relation to B as the rear wheels, but the initial relation of A to C, and particularly to D, is such as will occur mostly with semi-trailer outfits, in which case A can be taken as the fifth-wheel joint. The application to two-wheel trailers, dollies and trailers with fifth-wheel or axle steering is equally obvious, and it is noticed that curve D represents a backing movement followed by a go-ahead.

To see whether the method is fully applicable to backing movements of four-wheel trailer outfits, one must take cognizance of the practice so far followed, consisting in locking the front wheels when the outfit is to be backed up while unlocking the rear wheels and steering them by hand. The steering by hand should only consist in preventing the wheels from whirling around to their most extreme position and thereby blocking further rear-

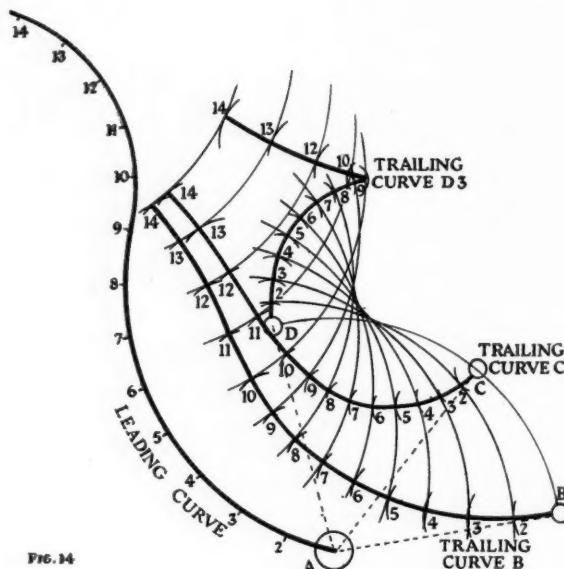


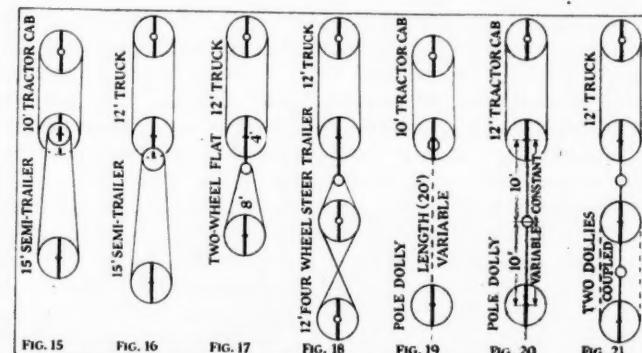
Fig. 14—Diagram showing how the tracks of trailing wheels can be easily plotted, when the curve described by leading wheels or by a relatively fixed point, such as a coupling hook, is known or assumed. By this method and symbolic figures for the vehicles (the figures drawn to scale) all movements in turns and maneuvers of semi-trailer and trailer outfits, as well as of trucks, can be put on paper and be made to serve the needs of drivers, designers, owners of transportation outfits and others interested. For explanation see text

ward movement of the outfit. On this assumption, the curve of the rear trailer wheels can be laid out in a diagram as a trailer curve determined by the curve described by the fixed front wheels. In practice some deviation from this course can be effected by forcing the unlocked rear wheels to a path not quite consistent with the path of the hook which pushes the locked front wheels, but some skewing, skidding and strains are involved which can scarcely be considered desirable. On the other hand, some drivers have acquired the knack of performing the simpler backing-up movements with a four-wheel trailer outfit without first reversing the functions of the trailer wheels. By holding the angle between truck and trailer drawbar down to a maximum of, say, ten degrees, they manage to push the trailer back, if the road is good enough, without having the push take effect first in turning the steering wheels of the trailer around to their limit. Possibly the locking and unlocking method is not the final one, since it interferes with one-man operation, and possibly the driver's method can be systematized and developed on safe lines.

For the present the regular method remains of superior practical interest, and, as it can be plotted with reference to the most frequently demanded maneuvers, it probably should be so plotted in order to help drivers to perceive quickly, in every arising case, how and how early the jockeying for place should begin if a certain desired position of the outfit is to be reached expeditiously and without alternation of backward and forward movements. The whole subject of backing and maneuvering with trailer and semi-trailer outfits could perhaps be covered sufficiently for the needs of drivers' training schools in a hundred diagrams, but is too large to be taken up here, although its relation to questions of steering and tracking is evident. Contractors and others having work on hand demanding maneuvering with transportation outfits day after day in the same places and in the same manner might find it advantageous to plot such maneuvering in advance for the particular outfits

to be used. Such a development would only be one among several which have accompanied the general introduction of haulage by motor power.

Even in the simpler matters of turns and turnouts on the road, the driver's share in making his equipment work satisfactorily is conspicuous. Figs. 7 and 8, as well as Figs. 12 and 13, reveal some of the points to be observed. The free-trailing outfit may be turned with some abruptness and without much reduction of speed if the leading vehicle is turned widely some distance before it is seemingly necessary. The closely tracking outfit, on the other hand, may turn much less out of its course, but should either reduce speed considerably—assuming that it has been run fairly fast on the straight stretch, where all tracking gear is dormant and harmless—or follow the gentlest possible transitions from one curve to another. As if to compensate, these transitions always can be gentler than with free trailing, since the turnouts of the leading vehicle can be smaller. And it is the driver's business to take this advantage to gain time and avoid snaking, with its irregular and alternating lateral strains and jolting. The lengths of the wheelbases and of the couplings influence the driving results so much, however, that very little can be said in terms of generality without a likelihood of errors or erroneous impressions. No sharp line of demarcation separates the free-trailing outfit from the forced-tracking outfit. Excepting only the truck alone and the tractor cab with semi-trailer, which are pure free-trailers, all outfits have couplings which force the next pair of wheels more or less and couplings which don't. And the results are a blend more or less happily conceived. The driver requires practice with each type of outfit and with different dimensions of units, and the only available auxiliary and part substitute for such practice would seem to be the study of diagrams, under suitable direction, the diagrams being preferably on a large scale with specified dimensions and distances, but with all superfluities of construction omitted. Perhaps it could be taken for granted that a somewhat general



Figs. 15 to 21—Symbolic figures adapted for use in plotting curves for the hauling outfits which they represent. In Fig. 16 the small overhang shown for the fifth-wheel coupling should be changed if the investigator has a different position of the coupling in mind. All other dimensions are similarly subject to change. Fig. 18 and Fig. 21 produce very similar curves, with the same dimensions for vehicles and couplings, the only material difference being that the wheelbase in Fig. 18 is constant, while that in Fig. 21 fluctuates slightly, getting shorter at sharp turns, with the rear bolster sliding as well as swiveling in its base. The positions of bolsters in the dollies is not indicated, as it does not influence the tracking, but in Fig. 19 the pintle hook is supposed to be so nearly in line with the front bolster that no provision need be made against longitudinal shifting of the load, or, if the load is lashed, the hook coupling may be slidable or the pole may be omitted, as suggested by showing it in a broken line

use of such diagrams would react favorably upon design and disposals.

All the trailer types and combinations diagrammed in Figs. 15 to 21 should now perhaps be shown turning a corner with a 24-foot radius for the driving wheels, also describing the composite curves required for turning off a straight course and back again, and possibly even for completeness in backing and maneuvers. The reader, however, can do this on a larger scale and for the specific dimensions which interest him most, and so nothing is done here but to present the symbolic figures which, it seems to the writer, can be suitably used for the work.

Ruts in the road can, of course, be troublesome for trailer outfits on account of the length of these in comparison with the length of those vehicles by which the ruts were formed, the difference naturally resulting in curves for the ruts conflicting more or less with those which trailer wheels should follow, and it is not evident that free-trailing wheels are always better off in this respect than wheels which track after those in front of them. There is likely to be some skewing and dragging. A yielding element is provided in automobile steering linkage in the buffer springs in the joints, and these may help somewhat. The worst case, on the other hand, seems to be where two pairs of wheels, not very far apart, are steered to opposite sides, as in vehicles with four-wheel steering. The matter, while perhaps

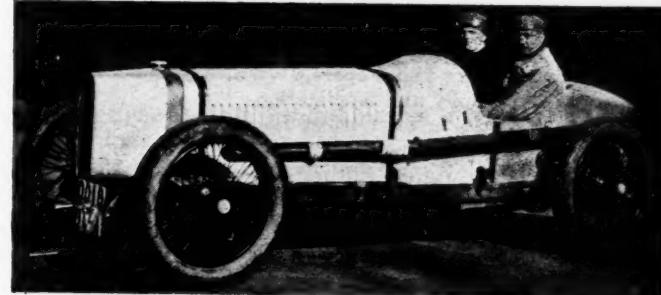
of minor importance, suggests at all events that the introduction of a suitable yielding element in the steering mechanism may become one of the requirements of the future, if trailer outfits are to ply largely on common roads, on a par with trucks in many classes of work. The remedy now must lie mainly with the driver and in the form of preventing the wheels from dropping into ruts wherever it is not clear how they can be taken out again.

The application of brakes to trailers in downhill driving is another matter connected with the subject and on which some development must be expected in order to make four-wheel trailers compete effectively with semi-trailers outside of the limited field where four-wheel trailers now show superior economy. The types represented in Figs. 18, 20 and 21, which are close trackers under pull, plot less determinate curves when they go from pull to push, as in downhill driving and backing-up movements, though the jointed and slidable pole for the dolly, in Fig. 20, is doubtless stiffened considerably by the load lashed to the swiveling bolsters. These are matters for consideration in the evolution of trailer service, but the writer is only suggesting a method for investigating them. As said at the outset, the subject also has a military angle and another one, both military and civil, relating to the use of caterpillar tractors—with some sidestepping ability not shared by other tractors—with either trailers or semi-trailers.

## The Sunbeam Car for Indianapolis Race

ACCOMPANYING illustrations show the engine and complete car which the Sunbeam Co., Wolverhampton, England, has entered in the Indianapolis race to be held on Memorial Day. It is, with a few variations, a replica of the three cars entered for the French Grand Prix. The eight cylinders in line have a bore and stroke of 65 x 112 m.m. (2.56 x 4.41 in.), giving a total cubic capacity of 2957 c.c. There are four valves per cylinder, operated by two overhead camshafts, each driven by a train of gearing at the front end, where also the water pump receives its drive direct from one of the intermediate pinions.

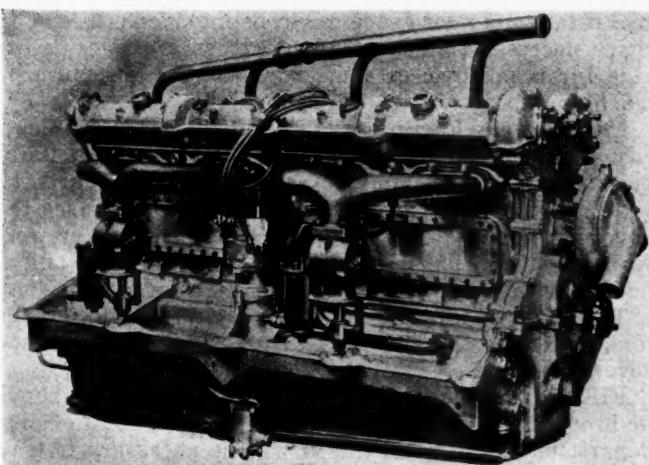
Originally four carburetors were fitted, but better results have since been obtained with two Claudels with branched manifolds belled out at the flanges of the ports of each pair of cylinders. The compression ratio is 5.7 to 1. Delco ignition is used.



The Sunbeam car entered in the Indianapolis Memorial Day Race

On the Grand Prix cars a four-wheel braking system is used, but on the Indianapolis car the rear wheels only are braked. The latter car is also peculiar in having the chassis as a whole mounted out of center in relation to the wheels, being closer to the left than to the right to assist cornering, which of course occurs in one direction only on the track.

The final gear ratio on top has not been decided upon at the moment of writing, but it is claimed that 130 b.h.p. has been developed by the engine and that 100 m.p.h. has been attained at Brooklands track on the third speed of the four ratio transmission.



The Sunbeam 3 litre racing engine has 8 cylinders in line, and uses four valves per cylinder. The latter are operated by two overhead camshafts.

VOLUME 1 of the Technical Report of the Advisory Committee for Aeronautics (Great Britain) for the year 1917-18, has recently made its appearance. It covers general questions, airships and general airplane research, and is a collection of reports issued separately during the war. A second volume will deal with propellers and full scale work on air planes and a third on strength of construction. These volumes constitute a record of the aircraft research done in England during the war.

# Idleness and Its Relation to Industry

This paper takes up the question of industrial idleness in its various phases and discusses it chiefly from the cost accounting standpoint. It contains, however, a remarkably clear analysis of the entire problem which will interest executives of every kind. Here is a pioneer effort in this field.

By T. W. Dinlocker and A. W. Wainright\*

**I**DLENESs is to the industry as disease is to the body. It does not depend upon recognition for its existence. In fact, the less it is recognized the more likelihood it has of thriving and spreading. Like disease, it must be treated or the body suffers. A diagnosis must be made to determine the extent of idleness before remedies are applied. It is the purpose of this paper to discuss the philosophy and classifications of idleness and to point out their source and effect on industry and suggest methods of reflecting the expense of idleness in such a manner as to bring it under control.

Idleness within the limitations of this paper may be defined as to the expense in connection with idle facilities of any nature whatsoever. The methods for securing this control will be discussed under the following subjects:

- I. Classes of idleness,
- II. Terminology—Cause and Control,
- III. Recording and Report,
- IV. Philosophy and Application,
- V. Accounting for Cost of Idleness.

The sources of idleness are usually found in management, men and outside influences. These sources may be due to either normal or abnormal conditions, which may be controllable or uncontrollable. These conditions fall into many divisions, which are usually reflected in idle facilities.

Classes of normal or controllable idleness are as follows:

#### Management

- 1. Excess facilities
- 2. Unequalized facilities
- 3. Obsolete facilities
- 4. Shortage of raw materials
- 5. Absence or lateness of men
- 6. Men waiting

#### Men

- (a) for work or material
- (b) for instructions
- (c) for set up
- (d) for helper
- (e) for power
- (f) for crane
- (g) for repairs
- (h) for tools
- (i) for miscellaneous
- 7. Men absent for welfare activities.

Classes of abnormal or uncontrollable idleness are as follows:

#### Outside influence

- 8. Business depression
- 9. Strikes
- 10. Labor shortage
- 11. Material shortage

\*Mr. Dinlocker is assistant comptroller, S. K. F. Industries, and Mr. Wainright is works auditor, Skayef Ball Bearing Co. The paper was presented before a recent meeting of the New York section of the Industrial Cost Association.

In the last analysis the management should determine what constitutes idleness, and the following discussion on terminology is offered in the hope that it will be of some assistance in reaching this decision.

**Excess Facilities:** To meet possible demands of customers for immediate delivery one of two conditions must exist: The stockroom must either be well filled with finished product ready for shipment and finished parts ready for assembly, or else there should be sufficient facilities in excess of the amount required for normal sales to produce without delay the increase in demand.

It is a question whether or not the manufacturers are willing to invest in excess facilities or prefer to keep a surplus stock of finished product on hand. The uncertainty, no doubt, is caused by the necessity of providing additional capital in either case and the resulting increase in carrying charges.

Without attempting to determine which of these methods the management should follow, we shall assume, for the purposes of this paper, that the method of providing excess facilities has been followed. If the excess equipment is evenly equalized throughout the producing departments, it is logical to assume that idleness will occur when the demand returns to normal.

The question of whether or not interest should form a part of cost is a subject which, for the sake of brevity, it is not proposed to treat in this paper.

When companies are established it frequently happens that additional land and floor space is provided which is in excess of immediate requirements. This is usually done for the purpose of allowing for the expected expansion of the business. In enumerating the various divisions of excess facilities, items in the nature of unused real estate and floor space might be included. It is sometimes necessary, also, to install excess facilities to provide for breakdown or some unexpected interruption in machine capacity.

**Unequalized Facilities:** Facilities become idle in cases where a regular flow of production is not possible because all the departments have not been synchronized to produce flow of work. It happens in some cases that one department is over-equipped and is in need of work, while another department is under-equipped and is flooded with work.

This class of idleness is usually a dead manufacturing loss, although these facilities might be utilized under several methods.

**FIRST:** Production in the lagging departments should be brought up to an even capacity with the most efficient departments, and to do this it will be necessary to make a careful survey of the product by operations, together with a study of machine capacities.

**SECOND:** Where the efficiency in all departments is

brought up to its highest point and it is found that a regular flow of production is not prevented by inefficiency in some departments, it is logical to assume that this condition is caused by unequalized facilities. A decision should then be made as to whether the excess facilities should be disposed of or whether additional facilities should be purchased in the lagging departments.

Before purchasing additional facilities a study of the market for the product should be made. Limited markets often make it exceedingly dangerous to counteract unequalized facilities by equalizing and throwing more production upon the sales department. To expand the production to a point over the maximum that could be expected in the particular trade would be violating the theory of demand and supply. In cases where the market is practically unlimited the point should be borne in mind that the securing of additional facilities would not only increase sales, but would also place into active operation facilities that are at present idle.

**THIRD:** To run overtime work in the lagging departments for a sufficient length of time to bring up the departments' output to the capacity of the departments in need of more work.

**Obsolete Facilities:** It is possible for facilities that have become obsolete to be permitted to remain standing in the plant. Unless they were put to work they would be reported idle and would consequently incur a certain amount of cost of idleness that is not offset by production. Whereas, if they were replaced by active facilities, production would increase and the cost of idleness would disappear, resulting in decreased cost.

**Shortage of Raw Materials:** Idle facilities may be caused by failure to receive raw materials when needed, which may be due to errors—either clerical or of judgment in planning and purchasing—which results in delay in shipping on the part of the vendor or uselessness when received at the plant.

Shortage of raw materials due to causes other than those above mentioned would probably fall into the classification of abnormal idleness and will be discussed under that heading.

**Absence or Lateness of Men:** Facilities become idle through absence or lateness of men. This might or might not be serious, depending upon the particular circumstances of the case. Some of the factors causing this idleness may be enumerated as follows:

- (a) Personal or family illness
- (b) Transportation delays
- (c) Weather conditions

There is another class of idleness, known as waiting time, which arises in the case where operators are present and are prevented from functioning for various causes, usually involuntary on their part. Waiting time, then, in our meaning may be defined as all time spent by productive workers in idleness for any reason whatsoever. Waiting time may be classified under many headings. In general, however, it is thought that the most important headings may be referred to and defined as follows:

**Waiting for Work or Materials:** Under this classification the operator may be idle due to:

- Faulty arrangement of facilities,
- Imperfect planning which results in poor routing and trucking of work,
- Improper stockkeeping methods causing delays in the arrival of material at the production centers.

**Waiting for Instructions:** Under this heading reference is made to idleness that develops in cases where workmen have carried their work as far as they can go

and are waiting for specific instructions, such as:

- Instructions lacking or missing,
- Defective or incomplete,
- Absence of blueprint,
- Absence of service card.

**Waiting for Set-Up:** Under this heading reference is made to idleness upon the part of workmen in cases where jobs are changed and it is necessary to readjust the facilities to new specifications.

**Waiting for Helper:** Idleness is caused in cases where it is impossible for a workman to proceed with the job in hand until he secures the services of a helper. This delay might be caused through the improper control of the workmen available.

**Waiting for Power:** Idleness is caused through lack of power, which may be due to internal or external causes.

**Waiting for Crane:** In some industries, where the product worked on is difficult to handle because of bulkiness and weight, it necessitates the use of cranes and other hoisting apparatus. In cases where these are not temporarily available idleness results.

**Waiting for Repairs:** Idleness results from facilities which are in the course of repair, some of the cases of which are as follows:

- Dilatory maintenance,
- Insufficient repair men,
- Careless and inefficient workmen,
- Lack of instructions to workmen,
- Defective facilities,
- Where the unit in a group is being repaired and another unit is idle,
- Lack of material with which to do repair work.

**Waiting for Tools:** In cases where it is necessary to use machine tools or tools for bench work, idleness is often caused by improper planning regarding the manufacture of the tools or by unsuitable design which could only be discovered after the tools were put into operation. Other causes are an insufficient quantity, tools in the course of repair and tools lost through negligence.

**Waiting for Miscellaneous:** It is customary to provide miscellaneous accounts to take care of items not applicable to subjects outlined and to provide a catch-all. It is sometimes the case that miscellaneous items deserve much consideration. This particularly refers to the idle facilities and to the apparent detail of the methods used in having workmen report their time.

An example might be based upon a factory of 100 working on a 10-hour day at an average wage of 30 cents an hour. It is also assumed that the workmen change jobs at an average of five times a day, taking approximately five minutes in the task of having their time reported closed on one job and started on another. The time lost for each day for each employee would be 25 minutes. This would represent 2500 minutes for the entire plant and, calculated at the average of 30 cents an hour, would result in a daily expense of \$12.50. This expense, carried on at this rate for an average working year of 300 days, would total \$3,750.

Modern timekeeping appliances permit the workmen recording their time without leaving their machines, and some planning systems are based on methods whereby truckers move jobs to and from workmen's benches and inspection cribs, having the time elapsed recorded by time clerks centrally located.

Another instance of miscellaneous idleness would be where workmen are allowed time off to wash up and ring out. A calculation of the expense of this nature can be made on the same basis as that cited above. It was not so much the intention of the writers to indicate

that a few minutes idleness of this nature would have a large effect upon increasing the expense of idle facilities. Very probably it would be impossible to make allowances in these cases and would be included in the time used, in which case no idleness would be reflected.

Another argument that might be advanced against the recording of such miscellaneous idleness might be that of the detail necessary in recording such small periods of elapsed time. However, inconvenience should not be the deciding factor in anything that is necessary and would prove of constructive value. There would be no rebuttal to this argument if the records were not utilized to prevent this indirect class of idleness. If the mere reporting of this information were but to call to our attention an occurrence which had heretofore remained undiscovered, it is felt that any expense incidental to gathering this information has well been capitalized in the subsequent correction of such leaks.

**Men Absent for Welfare Activities:** It is the custom in some establishments to conduct activities incidental to the welfare of the employees. Meetings of shop committees, athletic and beneficial associations would be examples. During the world war it was customary to conduct Liberty Loan rallies, and it is yet the custom to permit speakers to address employees, these affairs being held during working hours and on the company's time.

**Business Depressions:** Many reasons have been advanced as causes of our financial panics and business depressions, some of them the result of much study and thought. It is generally conceded that the most important factor is traceable to over-speculation and a consequent over-extension of credit. It is a noteworthy fact that business depressions have occurred in the past at approximately regular intervals, and, while history need not necessarily repeat itself, it is felt that idleness will always be caused by this factor. Industry receives its first tangible notice of depression in the form of cancelled orders, deferred shipments and a shrinkage in new orders received, resulting in curtailed production. While idleness resulting from depression cannot be directly controlled, its effect may be modified by operating the facilities that would ordinarily remain idle. Should it be determined to continue production, such decision would probably be based on reasons similar to the following:

**FIRST:** The willingness of the market to absorb product at manufacturing cost, thus eliminating the expense of idle facilities.

**SECOND:** Forcing sales at prices that will only return prime cost, ignoring burden consisting of fixed charges. The object contemplated by this method is the maintenance of the manufacturing organization, rather than the elimination of the expense of idle facilities, which would exist whether or not this procedure was adopted.

**THIRD:** Building up inventories by utilizing the facilities which would otherwise be idle for the purpose of being in a strategic position at the resumption of normal sales conditions. Production at such times would increase inventories which probably would not be readily disposed of if the depression was of protracted length. In such cases the ability to negotiate loans and to carry the resulting charges would be an important factor.

**Strikes:** Strikes may be defined as a form of manufacturing paralysis. It is usually temporary, and may be serious or trivial. During strikes labor and management may be said to be out of alignment. Most strikes are, in the last analysis, based on wage questions.

Strikes may be traced to many causes. As a general

statement, however, it is thought that the following causes are fairly representative:

1. Unfair hours and wages,
2. Loose employment methods of hiring and discharging
3. Improper methods of work.
4. Poorly qualified foremen.
5. Improper inter-relation of workers,
6. Lack of provision for safety and health,
7. Antagonism of labor organizations,
8. Agitation by radical influences,
9. Sympathetic strikes.

Since the strikes are more or less controllable, it is felt that the following policies would do much to reduce the hazard of idleness from this cause:

1. Sound wage plans,
2. Encouragement of employees,
3. Provision for advancement,
4. Mutual understanding.

**Labor Shortage:** Idleness is found in cases where local labor conditions are such that sufficient labor cannot be secured to operate the full capacity.

**Material Shortage:** Idleness under this heading is presumed to mean idleness resulting from delay in receiving material caused by forces outside, such as:

1. Inability of vendor to meet contract.
2. Transportation strikes.
3. Transportation embargoes.
4. Shipments lost in transit.

#### Recording and Report

In order that the management may be in a position to realize the significance of idle facilities, after which they may consider reasons and remedies, it is first necessary to provide practical methods of recording upon which proper reports or graphs may be based.

The recording of idleness will necessarily entail some detail work and consequent expense. It is usually customary in the industrial world to greet a statement such as this as being closely related to "red tape." It is assumed that management is always desirous of ascertaining factors causing loss.

Records are either useful or useless. To be useful a record must produce results, by which is meant pointing the way to increased profits. Records are inanimate and cannot of themselves produce profit. The best they can do, and all that may be expected of them, is a true reflection of conditions. Resulting action depends upon the management.

Recording of idleness may be accomplished through clerical or mechanical means. It is not advocated that workmen report idle time, as it necessitates temporary interference with his work and retards production.

In recording idleness the vital factor is the cause and mechanical means do not easily accomplish this result. Another objection attached to the use of mechanical means of recording is the expense incidental to the installation of equipment necessary. In view of the fact that all productive work is not machine work, and that all machine work cannot be automatically recorded, it is recommended that the recording of idleness be accomplished by clerical means.

In most establishments some method has already been devised for recording labor activities. It is suggested that the recording of idleness be assigned to the same authority. In order for them to properly record idleness they should be acquainted with the various classifications of idleness and the causes as enumerated above.

A form should be provided for reporting idleness and should contain what the management requires for forming an intelligent decision. In addition to such informa-

tion, it is thought that the following information must be included on the form:

Date  
Facility number and name,  
Duration of idleness,  
Cause.

Idleness is the difference between possible or standard hours and used hours, which should be supported in detail on the above forms.

By possible or standard hours is meant the hours the facilities would be normally expected to operate. In computing possible hours, Sundays, Saturday afternoons and holidays would be omitted. For instance, in an establishment operating a ten-hour day in a month in which there are 22½ working days the total possible hours would be 225 hours.

Having recorded the total amount of idleness in its various classes, the matter of preparing reports will now be briefly discussed. As idleness is either normal or abnormal, it seems advisable to prepare the report in such a manner that would reflect the total applicable to each class, analyzed into its subdivisions.

A report prepared along the lines of the attached form would seem to provide information enabling the management to realize the extent and seriousness of idleness in his plant and would aid him in surmounting his difficulties.

#### Philosophy and Application

In an earlier part of this paper idleness was divided into normal and abnormal classifications in order to explain what was meant by idleness that was controllable and that which was uncontrollable. Controllable idleness is governed by the manufacturing organization, while uncontrollable idleness may be traced to shortcomings on the part of the general or sales departments of the company. On the other hand, some items of uncontrollable idleness are caused by factors entirely beyond the regulation of any department.

If no distinction were made between these two classes the expense attached to each would probably be absorbed in manufacturing costs. The opportunity is taken at this time to point out that it might be profitable, from the standpoint of management, to charge manufacturing costs with the expense incident to controllable idleness and to relieve manufacturing costs for the expenses incident to uncontrollable idleness.

The reason both classes of expense have heretofore been considered as a proper charge to manufacturing cost may be found in the thought that accountants have not fully appreciated the problems of manufacturing and the viewpoint of the operating officials.

For this reason it has been the common conception of many manufacturers to feel that the average or unit cost increased as the volume of output decreases. This conception is technically correct, but there are many objections to absorbing into manufacturing costs the entire burden when the diminished output is caused by business depression. Fixed charges, such as depreciation, taxes, rent, insurance and administration, are items of expense which accrue regardless of idleness or activity. To reflect the general effect of fixed charges upon volume of output we shall assume a case where a manufacturer has two plants making the same product. We shall further assume that plant No. 1 is idle, while plant No. 2 operates at full capacity. Other things being equal, manufacturing costs at plant No. 2 would be normal. The fixed charges of plant No. 1 would continue and might entirely eliminate the profits of the business as a whole, but the cost of manufacturing the product

would not have been increased by the fixed charges of plant No. 1.

On the other hand, we may consider these two plants as two departments under the same roof; that is, plant No. 1 now becomes department No. 1 and plant No. 2 becomes department No. 2, both component units of a single organization; department No. 1 is still idle and department No. 2 is operating to capacity. Working under the common conception, the overhead would not be relieved for the expense of idle facilities, and the fixed charges of the idle department would be absorbed in the output. The result would be that the cost of manufacture in department No. 2, which includes the cost of idle facilities in department No. 1, would be higher than the cost in plant No. 2, where all the facilities were busy. This would be true, although all the facts are identically the same, with the exception of the treatment of fixed charges. This condition would be aggravated in the case of a manufacturer whose output was of a varied nature.

Whether or not the expense of idle facilities constitutes a part of manufacturing cost or should be treated elsewhere in the accounts is a basis upon which difference of opinion may form. However, the writers are of the opinion that the expense of idle facilities is not entirely a proper part of manufacturing cost, and, in support of this contention, offer the following reasons:

**1. General:** While true costs are needed at all times, they are especially helpful during periods of depressions when business requires careful administration. Absorbing expense of idleness in manufacturing results in widely fluctuating costs, and consequently the management is without the aid of the cost records in determining comprehensive manufacturing and selling policies.

**2. Effect on Manufacturing Management:** To include the expense of idleness in costs would prevent the use of cost records for purposes of comparing present performance with those of periods in which idleness did not exist. For instance, the output per unit might be higher, but the increased cost might indicate that the output per unit was lower.

**3. Effect on Financial Management:** In cases where the product is shipped as soon as manufactured, no difference in the net profit is shown, whether the expense of idle facilities is absorbed in manufacturing costs or treated elsewhere in the accounts. On the other hand, if the product is not promptly shipped and the tendency is to increase inventories, it will be found that undue inflation of inventories and profits follow. In later periods, when the product commences to move, profits appear to be much less on account of the inflation in cost. This is due to the fact that the profit had actually been anticipated at the end of the previous year through the inclusion in inventories of idle facilities' burden.

**4. Effect on Sales Management:** When selling prices are based on cost, the inclusion of idle facilities' burden would force selling prices so high as to prevent the securing of new business when the establishment needs it most.

Sales policies may be outlined in a more definite manner if the expense of idle facilities were known as a separate factor. The mere transferring of idle facilities' expense from manufacturing cost does not abolish it, and as such it must be borne in mind when outlining sales policies and prices. Knowing the extent of the expense of idle facilities as a separate factor would enable the management to determine the following:

- (a) The amount necessary to increase normal selling prices to provide more profit to be used as an offset to idle facilities' expense.

(b) When competitive or other conditions prevent increase in price the volume of sales necessary to increase volume of production consequently eliminating idle facilities' expense.

Whether or not the expense of abnormal idleness is to be absorbed into cost or charges elsewhere is a matter for the management to decide. In this discussion it has been the endeavor to show some of the points upon which this decision might be based. In any event, it is suggested that provision should be made for collecting the expense of such idleness as a separate element of costs.

For the most part normal idleness should be included in manufacturing cost, because it is felt that such idleness is controllable by management. Such idleness covers many items, but it is thought that the list mentioned under normal idleness is fairly complete. It is not reasonable to expect that there can be secured 100 per cent of possible operating time and, therefore, it constitutes a constant proper item of cost. Having determined to include it in cost, proper control may be maintained by collecting it as a separate account in the overhead. Where questions arise as to the amount of such expense that has been absorbed into cost, the treatment above prescribed will prevent any shifting of responsibility.

It is difficult in some cases to determine normal idleness chargeable to cost, as idleness due to excess facilities might have been caused by both manufacturing and financial policies. Excess facilities that are a protection to production in case of breakdown would be an instance of manufacturing policy. Excess facilities, such as land and buildings originally purchased with investment or expansion possibilities in mind, would be an instance of financial policy. It is suggested that a reasonable effort be made to distinguish between these two classifications of expense and appropriate reflections made in the accounts.

#### Accounting for Cost of Idleness

Having discussed the various arguments in favor of including in costs the normal expense of idle facilities and excluding from costs the abnormal expense of idle facilities, several methods of computing and applying the expense in the accounts will be reviewed.

The particular method of overhead distribution in operation at any establishment need not necessarily be discarded to install a basis for idle facilities' relief. However, burden distribution methods might have to be adjusted in order to accomplish the object desired; namely, that of having our costs represent the results of normal activities without the influence of abnormal factors of uncertain character and length.

It is not the purpose of this paper to enter into a technical discussion of cost accounting, but it is thought best to insert here a short discussion on the method of relief to manufacturing cost, the theory of which will hold, except as to detail, in most cases where idle facilities exist.

In view of the wide use of the "percentage of overhead to productive labor" basis of distributing overhead, we shall assume that the manufacturer uses this method. We shall assume, also, that his plant is divided into many departments, the facility in each department being approximately the same, and that the system in vogue provides for securing total expenses by departments. Referring to the example previously quoted, regarding two departments shut down and the other in full operation, it is obvious that the idleness in each department must be computed separately if the process or departmental costs are to be accurately relieved. This infor-

mation could be secured from a report similar to the one annexed to this paper, and the ratio of abnormal idle hours to possible hours determined.

It would first seem that this ratio should now be applied to the total departmental portion of burden, which includes all fixed charges, and relief made for crediting work in process account, and charging some general account outside of manufacturing. Before doing this, however, it is necessary to consider those expenses other than fixed charges, such as salaries and wages of factory administration, accruals to such reserve accounts as reserve for repairs, reserve for inventories, and other accounts not directly related to volume of output. There is usually a point below which a manufacturer cannot reduce organization and expense, while sales and output may continue to decrease far below this point.

Before applying relief it is, therefore, suggested that a statement of overhead be prepared to be known as "overhead eligible for idle facility relief." This is done by simply reviewing each account in the manufacturing card of accounts to determine its eligibility as part of the idle facilities' relief and listing on a columnar analysis sheet the accounts vertically on the left-hand side and the departments horizontally across the top.

As overhead is finally applied to product on the percentage of overhead to productive labor in each department, it is, of course, necessary to transfer the overhead of the non-production departments to that of the production departments before this ratio can be secured. This is also necessary in preparing the statement of "overhead eligible for idle facility relief." Therefore, each production department will absorb that portion of the non-production departments' total overhead as their productive labor is in proportion to total productive labor.

We now have before us the total for each department of those expenses which accrue regardless of volume of output. It is now only necessary to departmentally apply the "ratio of abnormal hours to possible hours" to totals of eligible overhead to secure the expense of idle facilities not chargeable to manufacturing.

The amount of this relief would be credited to each productive department and the total charged to profit and loss surplus, or reserves provided for idle facilities or contingencies.

By this method the expense of normal idleness controllable by the manufacturing management is indirectly absorbed into costs. It is felt, however, that it is necessary to collect this expense in one account, the caption for which might be "manufacturing expense of idle facilities," for the purpose of establishing a means of bringing this expense forcibly to the attention of the management. This is accomplished by crediting the various overhead accounts making up "eligible overhead" and charging, per contra, the "manufacturing expense of idle facilities account."

This account would also include the cost of all waiting time of the workers, consisting of wages paid to men waiting for tools, repair or other causes heretofore enumerated. The total of this account would represent a part of the general overhead distributed to the cost of the product.

In those plants that maintain service departments, such as millwright, tool room, electrical, carpenter, etc., all that has been said of idle facilities applies here with equal force. These departments usually work on additions, improvements and repairs of property, which expense is charged to operating or capital, as the case may be.

These departments resemble outside concerns, charg-

ing for their work at cost, and it is obvious that it would not do to inflate fixed asset values with the expense of idleness incurring subsequent to increased depreciation, insurance and tax charges applying against these departments. The remedy is to relieve the service department overhead in the same manner outlined for productive manufacturing departments, thus eliminating the inflation in charges to fixed assets and the overhead accounts of the productive departments.

If the facilities in the service departments take the form of machines, the method already outlined can be readily employed. With movable facilities, if it is impractical to attempt to measure the idle facility hours, it would then be necessary to absorb such percentage of eligible overhead in costs as the actual man-hours worked bears to the possible or standard man-hours.

If it is to be noted in this discussion, we have used the percentage on productive labor method of overhead distribution and the relief for idle facilities based upon facility hours. It is advisable wherever possible to use facility hours as a measure of idleness. If it is possible to use facility hours as a basis in arriving at percentage of normal and abnormal idleness, it may be necessary to absorb such percentage of eligible overhead in costs as the current production bears to maximum production. This method, however, does not take into consideration the inefficiency of workers, which might have the effect of eliminating more expense than the used time would justify.

In establishments using the machine rate method of distributing overhead, when actual burden exceeds predetermined burden charged to costs, it might be assumed that the entire difference represented cost of idleness. In this we do not wholly concur, because in originally setting up the machine rate, certain items included therein must necessarily have been established, and this difference may represent inaccuracies in the forecast of these items. It is also for this reason that the writers do not advocate the use of the machine hour rate multiplied by the idle hours in computing the relief for idle facilities.

Another reason against this method is that apparently

no distinction has been made between the fluctuating and non-fluctuating items in the rate. Using this rate without eliminating the items that fluctuate with production would result in excessive relief and would reduce costs artificially.

The writers have attempted in their suggestion to utilize the practical features embodied in the machine rate methods by using facility hours and eliminating fluctuating items of expense.

Having discussed the expense of idle facilities from a standpoint of normal and abnormal idleness, this paper would not seem complete unless the possible methods of reflection in the accounts were briefly enumerated, as follows:

1. Inclusion of normal and abnormal idleness in cost of manufacture.
2. Inclusion of normal idleness only in cost of manufacture, and disposing of abnormal idleness in one of the following manners:
  - (a) Charging direct to current profit and loss statement.
  - (b) Charging direct to surplus account,
  - (c) Charging direct to reserve for idle facilities or contingencies.

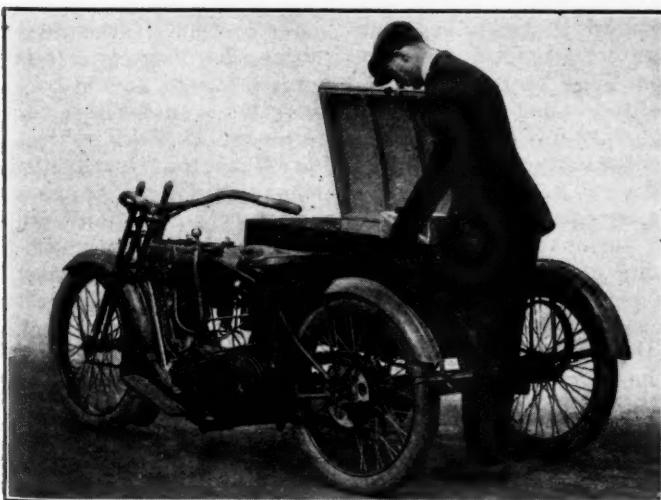
In concluding this paper the writers wish to express their earnest desire that they may have been of some assistance to the members of the association in solving some of the problems connected with idle facilities.

We feel that in these days of industrial depression our subject should be of paramount importance to the industrial executive or financial manager who is ever watchful and eager to ascertain actual conditions regarding the employment of his productive units and how their non-employment is reflected in the cost of his product.

Improved methods of dealing with industrial problems can come only from careful studies coupled with a knowledge of actual conditions. Progress in cost accounting, as in all other lines, must come by degrees and one step leads to the next. We trust that the above analysis of the problem of idle facilities may constitute a step toward the ultimate solution of all problems in connection with this subject.

## A Commercial Model Motorcycle

THERE has been some feeling among motorcycle manufacturers recently that a definite attempt should be made to broaden the sales field of the motor-



Harley-Davidson model 21-CD with side car designed for commercial use

cycle to more fully include commercial utilities. A manifestation of this feeling appears in the new one-cylinder model recently added to the Harley-Davidson line. This machine has been designed primarily to meet the requirements of commercial service. It is specially adapted to use for delivery purposes, for telephone company linemen and trouble "shooters" and similar classes of work.

The construction and design are in general similar to that of the regular "74-in., magneto-equipped, V-twin" machine, except that the rear cylinder is removed in this commercial model. The bore is 3 7/16 in. and the stroke 4 in., giving piston displacement of 37 cu. in.

The machine is designed for an average speed of 25 to 30 m.p.h.

A SUNSHADE visor which comprises a light but rigid frame of U-section steel, electrically welded, covered with Du Pont Double Texture Raynite fabric, padded to prevent wrinkling and sagging, has been brought out by the Troy Sunshade Co. The fixtures are so designed as to permit of adjustment of the visor to suit the driver's convenience. The visor is finished in brush-applied baked enamel with nickel-plated wing nuts.

# Chinese Famine Is a Boost to Automotive Industry

Realization of the meaning of transportation to the welfare of the nation is brought home to Chinese. American Red Cross building 100 miles of roads. Americans hold leadership in trade with sleeping giant of the East.

By Don D. Patterson\*

HERE was a day in China, many centuries ago when the imperial rule was at its zenith, that the nation had what was probably the world's model highway system—a system that penetrated into the farthest reaches of the land for official and military usage. But the national highway system followed closely the decadence of the Empire until to-day only cart roads and wheelbarrow paths indicate its course and these, for the most part, are in an impassable condition in so far as the motor car is concerned.

It is in the matter of roads that the greatest obstacle is found for the development of the automotive transportation in this Far Eastern republic. The desire for motors has been indicated by the Chinese over a period of ten or more years, but its growth has been seriously hampered due to confinement to the ports and larger cities of the interior, where passable highways are found. The total mileage of metal surfaced roads in China does not exceed 100 miles.

This condition would be discouraging to the western manufacturers of motors and motor equipment were it not for the fact that the past two years has brought forth the beginning of what will some day be a nation-wide movement for better highways. The movement has been thus far sporadic in its development and the roads that have been built are short in length and in the majority of cases widely separated.

Various sources may be credited for the impetus that has brought this about. The first modern road of any importance in the nation was that built by the American Red Cross several years ago from Peking to Tung-chow as a measure of aid for the sufferers from a disastrous flood in North China. Other road projects were started and as a result in the vicinity of the capital and Tientsin may be found the majority of the modern road mileage in the country. Shanghai has also been the seat of similar developments; a municipal road built by the authorities of the International Concession provides a drive near the outskirts of the city. A second road was constructed by the Chinese military authorities, using soldier labor, from Shanghai to Woosung, where the Yangtsze River joins the ocean, a distance of eight miles.

## Projects Planned

More recent projects include the construction of a highway from Tientsin, the route having already been selected, and the development of roadways in Kwangtung Province, around Canton. Foochow, an ocean port between Shanghai and Canton, has constructed motor

roads within its city limits and a private company is operating a bus line. Nantungchow, known as the model city of the Yangtsze Valley, which is practically owned and controlled by Chang Chien, former Minister of Agriculture, has a road system of thirty or more miles on which motor bus lines are operating. This system is being extended rapidly. Canton has also inaugurated a motor transportation system for passengers.

The famine which is now running riot in North China has also provided for the construction of roadways. The American Red Cross is building a highway of approximately 100 miles in length in the province of Shantung and other roads are being constructed to make use of the famine labor in other sections of the stricken territory. The famine in itself has been a grim object lesson of China's great need for motor transportation. The region in which the 45,000,000 people are affected is impenetrable except to the most primitive forms of cart and wheelbarrow transportation now used in the country. In many instances food is rotting at rail-heads with people starving 50 to 100 miles away due to lack of transportation. The relief agencies, with the exception of the Red Cross, have failed to recognize the advantage of motor transportation for the present, in their plans for the future, and are not using light trucks when it has been demonstrated that they are practical for the work in some regions. However, the recurrence of such a famine is highly improbable with the road system now under way.

## Merchants Are Leaders

Other road ventures are being organized in various parts of the country under the direction of the merchants and gentry of various cities and districts. It is from these ventures that the motor interests should take their greatest hope. Any organized construction of highways by the Chinese Government at Peking is at the present out of the question, since that institution is living a hand-to-mouth existence so far as finances are concerned and has only a dilatory connection with the various provinces, depending largely upon the efficiency of a system of graft. The merchants are the most progressive element in the country and their interest in road building may be taken as a good omen. Much of this development is centering around Shanghai, where it has foreign encouragement.

It has been suggested by foreigners in China that the motor manufacturers, particularly those of the United States, would find a greater field in China if they were able to organize a financial group that would make loans under supervision to the Chinese Government for the construction of highways. This plan, however, is hard-

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ly feasible at this time due to the formation of the International Consortium, one of whose purposes is to provide foreign money for the construction of railways and highways, and to the present unsettled and corrupt state of the so-called Republic of China. Each province is for the most part a feudal entity, giving allegiance to Peking so long as the funds necessary for the maintenance of a military autocracy in the district is forthcoming. There are two governments, that of Peking and of Canton, and with such a state of affairs a highway loan would probably be a failure.

#### Bankers Aroused

China's future existence depends largely upon her means of communications and now that the merchants and bankers are becoming alive to the possibilities of their nation it may be expected that they will interest themselves in providing these necessities. And when they do, China will be the most fruitful of all foreign markets for the automotive industry of the west. The Chinese will not be able to offer any domestic competition, for while cheap labor exists, it is unskilled and not easily adapted to complicated manufacturing such as is involved in the making of motor cars.

There is a phase of the road development that has not been touched and that is the possibility of foreign assistance in a moral way. The present motor car distributors have done nothing to encourage the building of roads and all developments have come from the individual initiative of the natives themselves.

The dealers seem satisfied with their sales in the treaty ports and with one exception have done little or no pioneering. One firm handling the most popular low-priced American car now has a representative in the country districts of Central and North China who is pushing through on almost impassable roads, working on the principle that motor cars will bring good roads, and is selling cars in isolated districts where they are being operated successfully.

#### Importance of Treaty Ports

The present automotive industry of China centers in the treaty ports of the country. Shanghai has the largest number of distributing and service plants, Hongkong and Tientsin following, and Hankow, Canton, Tsingtau bringing up the total. There are small hire services in other parts of the country and branch plants of Shanghai interests are opening up in Peking, which has been heretofore served from Tientsin.

The Shanghai distributing plants are largely American and British, with one or two French concerns in the field. The majority of the standard makes of America, Great Britain, France and Italy, of both motor cars and trucks, are represented as well as the leading tires and accessories of all the countries mentioned. For the most part, the Shanghai plants are on a par with those of the larger cities of the United States, including machine work and repairs, tire servicing, and body building. The latter has come to be a large part of the industry in China, due to the inability of many of the bodies imported to stand up under climatic conditions in China and more especially the desire upon the part of the Chinese buyers for distinctive and luxurious equipages. The Shanghai plants serve Central China territory, although some extend into North China. The Tientsin industry serves North China and Hongkong has the south. The development in the south is the most backward in the country, Canton only being a motor possibility.

The sale of motor cars in China is, like all business of an import nature in the country, largely affected by the fluctuation of exchange. During the year of 1919

China imported motor cars, trucks and cycles to the value of \$6,242,368, and 59.6 per cent of the total came from the United States. For the year of 1920 this total will be materially reduced due to the falling of exchange from the beginning of the year. During the latter part of 1919 one Chinese dollar would buy \$1.15 in American currency, while at the present time it would take \$2.20 Chinese currency to buy one American dollar.

#### Prices Vary Constantly

The exchange rate between China and America is continually fluctuating and consequently each shipment of cars from the United States has its price, depending upon the rate of the day when the exchange was settled. As a result two similar models of the same make may have a price varying from \$100 to \$500, all due to exchange. There is no way that the dealer in China can set a fixed price for the year as is possible in the United States. This causes a rising and falling demand in the motor market, depending upon the relation of Chinese currency to the American dollar or to the currency of the country from which the car is imported. Nothing can be done to remedy this until a reformation is effected in the currency system of China, which will be some years in coming.

An attempt to stabilize the industry in Shanghai is being made by the organization of a dealers' association for general protection and the advancement of motors. This association will take up also the matter of roads and is launching a plan for the establishment of an annual motor show next fall. The show will be the first in the Far East, that is, in the section east of India.

#### Counting the Cars

The motor population of China is difficult to estimate due to a lack of registration in some sections of the country. Shanghai has the largest, with approximately 3,000 cars and 1,000 or more trucks and motorcycles. Tientsin has approximately 500 to 700 cars and Peking a like number. Canton has only a few and a hundred or so are scattered around through the various sections. Tsingtau has probably 100 and Hankow approximately 300. Hongkong, being British, cannot be included in any estimate of China proper. A number of cars are centered at Kalgan on the Gobi Desert of Mongolia, where, under government supervision, a motor line is operated between that point and Urga, the capital of the province, half way to the Russian border. A recent order will place fifty-seven Fiat trucks in this service within a short time. The Kalgan to Urga trip over the desert takes four days and the round trip costs \$300, Chinese currency.

American makes predominate the motor field due to the close proximity of the country, the more favorable prices, and the activities of the manufacturers in the export field. England is paying little or no attention to China from an automotive standpoint and most makers will deliver only a half dozen or so cars during the year. France is giving all of the attention to the field she can and Italy is following her example. However, the American manufacturers have the advantage of being firmly established on the ground and of having factory representatives in the field approximately twice each year. A number of the larger motor manufacturers of the United States have direct representatives who are permanently established in the field to assist the distributors and to organize their services. As a result even the larger British firms handle a majority of American makes.

There is one disadvantage in the field at present and that is that most of the distributors in China represent

too many makes. There are two notable exceptions in Shanghai and these, having only a few American makes, have the lion's share of the business due to their ability to push these makes and to pioneer in the territory assigned.

#### Future of Trucks

Motor trucks are coming in for their part of the recognition and when the day comes that China has a semblance of a highway system, trucks are going to be more important in the country than railway trains. Trucks are already in daily operation in Manchuria, Mongolia, in Kiangsu Province, in the city of Foochow and elsewhere. The truck population of Shanghai is growing rapidly and the city is supporting one public truck transportation line with a fleet of approximately twenty-five. A majority of the larger Chinese manufacturing plants are using trucks, as are the Chinese and foreign department and other stores. As Shanghai is the most important shipping port of China, the trucks are playing a large part in the movement of cargo—a part that will increase rapidly.

#### Gay Turnouts

The Chinese have taken up the motor car rapidly and the wealthier classes are never without them. They fill the inherent craving for display and ostentation as well as being a utility. The limousine because of its luxuriousness is the most popular and the fittings of many have given them the nickname among the foreign population of "rolling boudoirs." This type is painted a brilliant red or yellow, or perhaps a blue, pink or purple. The fittings inside are of the same color, generally in brocaded Chinese silk, and the equipment consists of silk tasseled curtains on the windows and doors, draped back, and Chinese vanity cases on the rear of the back

seat, containing a full line of cosmetics, a cigarette case, matches, a mirror and other luxuries. The younger generation have taken to vivid colored sport roadsters and all young or old are addicted to speed. The Chinese chauffeur has no nerves, no conscience and the pedestrian moves slowly with the habit of centuries in only dodging wheelbarrows, carts and rickshaws, resulting in a rather large toll of daily accidents in the cities where motor cars are most numerous. Traffic problems are Chinese puzzles, figuratively and literally.

There is a great future ahead of the automotive industry in China, but it is a prospect that will take years in the realization. At the present moment China is in the throes of a business depression that is more gloomy than that of the United States for the reason that she has no organized bank system to tide her through, no organized system of business communications and her markets are largely dependent upon foreign sources. The next year or so will be slim ones for foreign business in China and the automotive industry will suffer a trifle more even than the others concerned. Rising exchange will come only when exports begin to move—and there is at present a dead calm in the export market—and that movement will only result when demand revives in the United States, Great Britain and, to a lesser degree, Europe.

China should be cultivated by American motor manufacturers, encouraged to build roads and kept closely in hand. When the road development does come, China will offer one of—if not the greatest—largest export motor markets of the world. She has 400,000,000 in population and while that population is for the most part possessed of only a scant buying power, if there was only one in every 400 who could buy a motor car every three to five years it would tax the capacity of the manufacturers of the United States and other countries to fill the demand.

## Hundred Passenger Plane Reported Wrecked

IT is reported that the enormous Italian flying boat with six 400 hp. Liberty engines and with seating accommodations for 100 passengers—recently completed and described below—was wrecked during its first ascent on Lake Maggiore. *The Aeroplane* of London, whose editor made a trip to Cesto Calende, where the trial was to take place, prints several views of the wreckage. The Caproni Works will not admit the destruction of the machine, the official report being to the effect that the machine made a flight of a mile and on descending was damaged so that it was retired for slight repairs. The unofficial report was that pilot Sembrini took the machine off the water, got her up about 60 ft. and then gently put her nose down and continued so till she drove it under the water. Mr. Gray says, "considering that she had four Liberty engines on her forward planes and four more aft, with very small elevators and yards of space between the engine masses, it must have been very difficult to counteract her enormous longitudinal moment of inertia, and so the story has every semblance of truth." The wreckage which he photographed was said to be that of an ordinary triplane on floats which about the same time made a complete submersion, but it bears remarkable resemblance to the published photos of the eight-engined machine.

According to a report by U. S. Commercial Attaché H. C. McLean at Rome, the huge flying boat was made up of three triplanes with the tails removed, placed one behind the other. Between the wings of the rear set of planes were placed the rudders, while the elevation of

the machine was controlled by ailerons on all of the wings. The length of the ship was 75 ft. and the wing-spread 108 ft. It was equipped with eight low compression Liberty engines of 375 hp. each, making the total available power 3000 hp. Its weight was about 16 tons and it was designed to carry a load of 10 tons, making the total weight 26 tons.

The cabin, which was entered through a door at the stern, was 7 ft. high, about 8 ft. wide and ran the entire length of the ship. A narrow aisle ran down the center, with comfortably upholstered seats on both sides. At the bow a small compartment was provided for the commanding officer, while a ladder led to the pilot's post, immediately behind and above, from which all operations were controlled. Provision was made for two pilots, one of whom was to be in reserve, and between the two seats was located an electrical switchboard for the transmission of orders. Two levers at the right permitted the pilot to control the engines without reference to the engineers in case of emergency.

The engines were mounted in two groups, four in the first set of planes and four in the last. In each case two engines were placed back to back directly in the center, with one on each side, the central engines being equipped with four-blade propellers, and those on the sides with two-bladed. Provision was made for one engineer for each set of engines. During its first trial the ship was to carry only sand ballast.

It was estimated that the total cost of the new airplane exceeded 4,000,000 lire.

# The Spirit Behind the Dealer Contract

An automobile salesmanager recently discussed dealer relations in an informal way and said some interesting things. "To exercise control over dealers," he said, "it is primarily necessary to convince them you are trying to help them. It is the spirit behind the contract that counts."

By Norman G. Shidle

NOT long ago I had an interesting talk with the general sales manager of one of the largest automobile concerns in the country. The talk was specially interesting because of the universal increase in attention being given to marketing, dealer relations, etc., and because this sales manager has been conspicuously successful in carrying out his work.

Discussing the matter of marketing, he outlined some of the plans which he is using to help dealers in making sales and in decreasing sales resistance. A number of these plans depend very largely upon the co-operation afforded by the dealer and the attitude taken by the dealer toward the help extended. Some of them, in fact, seemed to call for a very strong control of the dealer organization by the manufacturing sales department.

When some of these plans had been outlined, the thought came to my mind that it might be very difficult in many cases to get the dealer to operate so closely under the supervision and control of the manufacturer; that the dealer would be likely to feel that his own way was the best and to resent too close supervision. So I asked this sales manager if he didn't have a good many troubles on this score. I said that it seemed to me as though the plans might work more successfully if he were operating factory branches instead of dealer; but that under present conditions such control appeared difficult.

"Well," this sales manager replied, "that is not necessarily as true in practice as you might think. It depends very largely upon the attitude and actions of the manufacturer as well as upon the sort of dealers that you have.

**"The primary necessity is to convince the dealers that you are trying to help them; that you understand how closely bound up with their success is your success. This must be done in actions as well as in words. During the last few years, for instance, when all the dealers were asking for many more cars than could possibly be supplied to them, I made it an invariable rule to treat every dealer in exactly the same way."**

"As you know, we have worked out a quota system on a scientific basis, so that our production can be proportioned to the various territories in a fair and accurate manner. On the basis of this quota system, we proportioned our cars during the entire period of peak demand. We gave the same treatment to the country dealer that is accorded to the city dealer, even though the latter had enormous demands at a certain time. Through it all, we kept the confidence of our dealers, because, even when they wanted extra cars most and couldn't get them, the big dealers felt in their heart that we were on the level. They knew that while they couldn't get more than their share, no one else could either. In other words, to put it frankly, every individual dealer knew we were square because we wouldn't cheat for him.

**"That is just one example of how by actions dealer confidence can be built up. And I often think actions are of more importance than house organ messages in many cases."**

"Take the matter of dealer contracts, for instance, about which there has been considerable stir lately. The bad practices of a few manufacturers and dealers cause a lot of disturbance. It is foolish to talk about the elimination of a cancellation clause from the contract. It costs us money to establish a dealer; we invest a certain amount in every new dealer we take on, and that investment must be protected. If we find we have an inefficient dealer it is not profitable either to him or to us that he should continue his connection with our organization.

"As far as suddenly cancelling a dealer's contract is concerned, the manufacturer has nothing to gain from cancelling the contract of any dealer who is doing satisfactory work. His success is our success. In fact the manufacturer cannot possibly be successful unless he has an efficient and effective dealer organization.

**"That is the fundamental to which the whole thing boils down. A sound basis of mutual understanding and mutual desire for a square deal is far more important than any words in a legal contract. The perfect contract can never be written in black and white. It is the spirit behind the contract that counts."**

Perhaps much of this sounds like theory. Probably some one will object that all these general ideas are all right, but that it is different when it comes to actual practice.

There are some things in this world which cannot quite be reduced to statistics or figures. An understanding of certain abstract factors is necessary to success in modern merchandising. The results obtained from such an understanding will be very practical, however, as can be noted in this case.

It will be admitted that there has been considerable dealer unrest during the last year. The dealer personnel of this manufacturer, however, for 1921 comprises 98 per cent of those associated with him during 1920, a remarkable record in view of the conditions. Moreover, this bunch of dealers has been selling more cars than the factory can produce for over two months.

These facts go a long way toward emphasizing the importance of the spirit behind the dealer contract.

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**T**HE Union Petroleum Co. is marketing a new cutting oil known as Wilkut. It is claimed to be a better coolant than lard oil. It requires no mixing or diluting, is sterile, does not corrode bronze or other bearings of machines or discolor work. The oil is transparent, enabling the workman to see his work at all times.

# Production Manager's Relation to Fatigue Studies

New methods of observation for fatigue studies were used in recent British investigations. This article discusses the general application of these principles and indicates the function of the production manager in translating the results of such studies into practical operations.

By Harry Tipper

FROM time to time in these articles reference has been made to the question of fatigue and the relation between the fatigue established, the hours of labor, the physical requirements of the operation and the surroundings. In considering these items, reference has been made to the investigations conducted by the medical profession, the value of these investigations to industry and the limitations of them.

In Great Britain the long development of the industrial system from its early beginning, the crowded condition of the country and the character of the climate have combined to make the problem of fatigue of more importance from the physical standpoint. During the war medical committees were appointed to inquire into the health of munition workers, the conditions in the munition factories, and to make recommendations regarding changes in the character of the factory surroundings and hours. This work has been continued by the Medical Research Council, which is a department of the government. This council has issued an extended report upon the atmospheric conditions and their effect upon fatigue.

The principal points of interest in this report are the new methods adopted for observation and the extended investigations into wet and dry temperatures, cooling powers, air velocities and similar conditions entering into the atmospheric surroundings of the worker. Interim conclusions have been arrived at concerning the effect of these variations upon the fatigue.

**The present report is confined to the boot and shoe factories, but the methods of making observations would be of interest in a great many other cases. The report shows the difficulty of separating one factor in the surroundings and noting its effect without the other factors entering into the conclusions. It also indicates the intimate relation existing between the surroundings, the character of the clothing worn by the worker, the condition of the worker's health at the time, and so forth.**

The report lays emphasis on the government of the air in the work room, and a variation in the temperature naturally associated with such movements has elements of great importance in lessening the fatigue and increasing the co-operative powers of the worker.

In order to determine the conditions affecting the loss of heat the board used the kata-thermometer, which measures the cooling power of the air. The dry kata loses heat by radiation and convection; the wet kata by radiation, convection and evaporation. This makes it possible to secure some indication of the ability of the

skin to exercise its cooling effect. The measurements are made in the immediate location of the worker. The comparisons are not exact because of the effect of the clothing and the work itself upon the loss of heat from the body.

Mainly, this report shows what a long way we have to go before we will be in a position to determine accurately the effect of the surroundings upon the physical conditions of the worker.

It is obvious that our knowledge is confined to very elementary conclusions of a general character concerning the temperature of the air, the moisture in the atmosphere and its movement. It is not surprising that the conditions in various manufacturing establishments should be so different when the best investigations of the medical man have been able to prove so little in respect of the required elements.

In this country the researches of the medical man into fatigue have secured little attention from the business man, so that even what is known at present about the effect of fatigue upon production is not fully considered in the working out of the factory organization. The importance of examination of fatigue has not been appreciated by the manufacturer in its effect upon production efficiency, and therefore the production cost.

Very little has been done in the examination of distinct occupational groups within the various industries and the effect of the particular work upon which they are engaged, except in those special cases where the character of the work has been obviously dangerous to the health. The reports which have been issued from time to time in this country and abroad are still somewhat general in their examinations, and not sufficiently exact to be of much benefit to the production manager in his attempt to determine the practical conditions of his organization.

There is lack of co-ordination between the researches of the medical man and the various engineers concerned with factory building and organization, so that many of the researches are academic in character and have not resulted in the development of practical measures designed to overcome the difficulty.

Heating engineers, ventilating engineers, building engineers and medical men interested in industry must co-ordinate their researches very much more closely if the discoveries in the one case are to effectuate practically in the other.

There is not much value to the production manager in the observations of the medical man, unless these can be translated into the practical construction and the equipment of the factory without an unbearable expense. The desirability of proper light, heat, ventilation and movement of air within the factory is admitted by all industrial engineers and production men.

The progress in factory building and lighting indicates the attention which has been paid to these matters, but the construction of a factory offering the best conditions possible, for the reduction of fatigue on account of the surroundings, depends upon the combined efforts of these various engineers and their knowledge of the medical researches. This demands a co-ordination of effort in research which has not been secured at present and which has minimized the effects.

The conclusions derived from the researches into the physical surroundings and their effect upon the physical condition must be accepted with reserve at the present time, because they are always complicated by the mental factors entering into the condition of fatigue. All that they can do in themselves is to establish the broad general necessities in regard to the physical conditions of the work and the surroundings in which the work is done.

The limitation of physical effort to a reasonable average requirement, the provision of proper floors where the work requires continuous standing or walking, provisions for changes in the position where the work is concentrated, proper arrangements for light, the elimination of fumes and smoke, continual replacement of the air and a proper amount of heat must be determined for an average individual under the average requirements in the factory.

These general matters can be determined so that

the conditions of work minimize the fatigue to some extent. They do not alter the accumulation of fatigue on account of the character of the work itself, and the incentives which are developed by the work.

The processes of their practical working out in factory organization is a slow one and they can only be improved detail by detail, so that their effect upon the production efficiency is not very marked at any particular period. They are valuable because it is obvious that any improvement which can be made in factory organization in agreement with the known laws of health will eliminate some of the difficulties under which the workers labor, and to that extent prevent accumulated fatigue or loss of health from other causes.

Naturally the working out of organization improvement within the factory depends upon the advance in the engineers' capacity to provide practical methods of improvement. This question of physical fatigue as influenced by the surroundings and conditions of the work is one which must be solved by the engineer and the production executives.

The researches which are being made from the medical standpoint can be understood readily by the engineer who will give some study to the matter, and they will be of great value to him in their suggestion of present deficiencies and the possibilities of improving present conditions.

There should be a larger interchange of information along these lines and a larger discussion between those industrial engineers who are interested in examining human efficiency and those medical men who are interested in industrial health. Such interchange would benefit the practical situation by the general understanding of the conditions secured on both sides, the better direction of future research and the better examination of practicalities.

## Individual the Most Important Factor

THE general outlines of the Studebaker co-operative plan are well known throughout the industry. The plan provides, among other things, for stock owning by employees, bonuses for continued service, pensions, vacations, checks, etc. The plan has been in operation for over a year and a half and is being conducted with considerable success.

A recent informal conversation with Dr. C. A. Lippincott, who has charge of the administration of the plan, however, brings to light certain factors in regard to industrial relations not discussed so frequently as those pertaining to group labor policies. Dr. Lippincott believes very thoroughly in the essential soundness of the Studebaker co-operative plans. They are economically and ethically sound and for that reason operate to the mutual advantage of both the corporation and the employees.

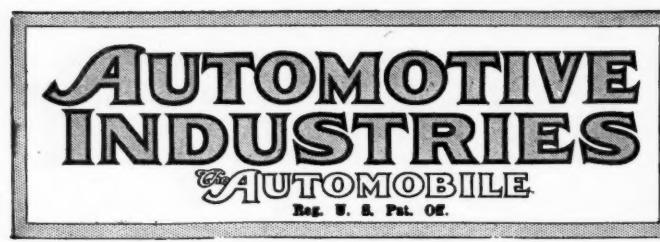
There are certain factors involved in the matter of industrial relations, however, not included in such plans. The relation of the individual to his job, for instance, is not accounted for by any group plan. The question of the mental effect of continued performance of the same simple operation day after day, the possibilities for promotion for the average worker through the experience gained on the job he is doing, the effect on the individual of the continued tendency toward specialization—all of these things constitute industrial problems which can be handled successfully only through the proper study of the individual.

Dr. Lippincott believes that the work his personnel department is doing in regard to the handling of individual complaints, the adjustment of minor working conditions, the changing of a man from one job to another when he becomes tired of the monotony, etc., is of equal if not greater importance to that of administering the co-operative plans.

He says that these problems relating to the individual are as yet solved only to a very limited extent. His department recognizes the presence of such problems, however, and is gradually attempting to work out a solution through careful study and intelligent analysis of the various factors involved.

This statement of the importance of a study of the individual is specially interesting as coming from Dr. Lippincott, since he is associated with the administration of highly successful group labor plans. In other words, it emphasizes the essential importance of the individual as the fundamental industrial unit, without minimizing the comparative value of the broader and more readily established mass methods of dealing with the labor situation.

THE new British motor taxation is yielding larger sums than was anticipated. During January and February the total receipts amounted to £7,092,400. The statistics indicate that owners of commercial road transport vehicles are contributing over 50 per cent. of the revenue from the new taxation.



PUBLISHED WEEKLY  
Copyright 1921 by The Class Journal Co.

Vol. XLIV

Thursday, May 12, 1921

No. 19

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Canada .....	One Year, 5.00
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Owned by United Publishers Corporation, Address 239 West 39th St., New York: H. M. Swetland, President; Charles G. Phillips, Vice-President; A. C. Pearson, Treasurer; Fritz J. Frank, Secretary.

Entered as second-class matter Jan. 2, 1903, at the post-office at New York, New York, under the Act of March, 3 1879.

Member of Associated Business Papers, Inc.

Member of the Audit Bureau of Circulations.

Automotive Industries—The Automobile is a consolidation of The Automobile (monthly) and the Motor Review (weekly), May, 1902, Dealer and Repairman (monthly), October, 1903, and the Automobile Magazine (monthly), July, 1907.

## Tractor Industry's Big Task

WE know that power farming is the surest method of reducing production costs. If the farmer and public as a whole do not know this fact it is our own fault."

This was the answer of Finley P. Mount, chairman of the Tractor and Thresher Department of the National Implement and Vehicle Association to the comment recently heard that low price of farm produce was slowing up tractor sales. The answer appears to be complete and it also appears to be a justification of the recently established Power Farming Bureau by this association. This bureau is to supply accurate information concerning power farming and is to co-operate with the farm press and with agricultural institutions and organizations to advance the power farming idea.

It is a big undertaking to re-educate a great public, like the farmers of this country, to a new process of operation. Just how large a task this is one can judge by noting how slowly manufacturing plants, mercan-

tile establishments and other business institutions accept devices and machinery which clearly show an ability to increase profits. The advertising task before the tractor industry is a considerable job.

## Recommended Practice in Hub Design

THE controversy between those who favor standardization and those who would leave everything to the judgment of individual engineers is as old as the effort to create standards. To-day most engineers occupy a middle ground; they favor standardization so long as it does not tend to throttle initiative on the part of the designer, but they oppose it when the tendency is to trespass upon ground which the engineer considers strictly his own.

It is, as a matter of fact, extremely difficult to draw the line between things which should and should not be standardized, while commercial and other considerations complicate the problem. It may be said in general that standards are necessary where interchangeability is required, or where units made by different groups of manufacturers must fit together, but this need not interfere with initiative or with originality in design. For example, several dimensions of the flywheel and its housing have been standard for some years and are quite generally used to the advantage of all concerned, but many non-standard flywheels and housings are used, and there is nothing to prevent any maker not so benefited from using other dimensions if he desires.

So long as all the parts for a given machine are made in the same plant they are readily made interchangeable, though even then certain standards must be established and maintained, but when parts for a given assembly are made in different plants, standardization becomes a necessity.

Interchangeability and mating between parts of like or similar character brought about by standardization has been one of the largest and most important elements which has made the modern low-priced American automobile possible. In England, where there is very little standardization and every manufacturer makes, to his own design, nearly all the parts of the car, the automobile is relatively high priced and its field of usefulness is correspondingly limited.

The enormous parts business which has developed in this country has been made possible by a willingness of manufacturers to co-operate in making parts that will fit together. This interchangeability has made possible large quantity manufacture and correspondingly reduced price to the benefit of all concerned. It has, perhaps, limited originality to a slight degree, but the benefits gained far outweigh the slight disadvantages, and the great volume of business which has resulted has widened rather than narrowed the field for the engineer, or perhaps we should say has provided far more work for engineers to do than would otherwise have resulted.

Axes and wheels are made, for the most part, by different groups of manufacturers, and it is not at

all surprising that these groups find it necessary to bring about standards which will enable their respective products to fit together without innumerable small changes which in themselves are of little consequence so far as the design is concerned, but which cause no end of trouble and needless expense in changes in tools, patterns, etc.

The remedy is, of course, the adoption of standards or recommended practice in hub design. Since the hub design depends, in turn, upon spindle and bearing sizes, certain selections in this regard are necessary and have been made. Since two types of bearings are available, two sets of standards or recommended practice are to be proposed at the coming semi-annual meeting of the Standards Committee of the Society of Automotive Engineers, one intended for the use of inch dimension roller bearings, and the other for metric size ball or roller bearings.

The subject has been given thorough consideration by those interested, and the proposals to be made involve chiefly or wholly connecting dimensions (not details of design) and are said to have the approval of all prominent makers of ball and roller bearings and wood and steel wheels, as well as of many axle and truck manufacturers. In arriving at the recommendations to be made in the report of the Truck Division of the S. A. E. Standards Committee, all arguments for and against the adoption of recommended practice have been heard and, except for those who oppose any standardization, are believed to be composed.

No one who opposes the use of this or any other recommended practice is obliged to use it, but if there are any valid objections to the recommendations offered, opportunity to express them will be afforded at the forthcoming meeting. Those who desire to see the recommendations accepted by the Standards Committee and the Society should not fail to attend the meeting, in order that the vote may be representative and not biased by a minority who do not favor the recommendations.

AUTOMOTIVE INDUSTRIES believes that hub standardization is desirable, but has gladly given much space to those who oppose it, as well as to its advocates. We are inclined to the belief that the report now agreed upon by the Truck Division is worthy of acceptance as recommended practice, and think the Society is to be commended for bringing together conflicting elements. Those who are vitally concerned, however, are the ones who will either use or be handicapped by the proposals, and both sides should be fully represented in the final vote.

### "Scratching Gravel"

THERE was a business man in a town of about 100,000, who had a large corner office on the third floor of the largest office building in town. He had occupied that office for three years.

The other day an automobile salesman called on him in his office, told him about the car and sold him a car the next day. Although financially an excellent prospect, this man had not owned a car before. But this was the first time during the three years that an

automobile salesman had ever called on him or approached him in regard to buying a car.

This business man was interested, so he asked the salesman how he happened to call on him. The salesman replied that until a month before he had been a salesman for office furniture. He had always called on executives in search of a market for his product. When he started to sell automobiles he naturally followed out the same plan as before.

The experience of this business man would indicate that the actual listing of prospects has not come "naturally" to enough automobile salesmen. This story is told by a well-known salesmanager, who cites it as an instance of what he believes to be the essential factor in bringing sales back to normal—"just naturally scratching gravel."

### A Standard Sprocket Tooth Form

ONE of the most important pieces of standardization work now under way is that on roller chain sprockets. Heretofore most of the companies manufacturing roller chains have had their own form of sprocket tooth, and, while all used the standard pitches and widths, the sprockets of one concern were not strictly interchangeable with those of another. Moreover the old style of sprocket, in which the chain, when worn, bore only on a single tooth of the sprocket, was not very efficient, because with such contact the pressure on the roller and tooth was necessarily very high, and the wear, therefore, was rapid.

In the new form of sprocket tooth, already agreed upon by the chain manufacturers and which will undoubtedly be ratified shortly by the standardizing bodies, the pressure between chain and sprocket will be divided between a number of teeth whether the chain is new or old. When the chain is new, the rollers will bed at the bottom of the tooth spaces, whereas, when the chain is worn, contact will occur farther up the side of the teeth. The conditions of contact will, therefore, be substantially equally good whether the chain is new or old, an advantage which has long been confined to the silent type of chain.

### Roads and Reputations

A PROMINENT highway engineer told a group of his fellow workers recently that their job was to build roads so that they would last. "Ten years from now," he said in effect, "the people won't care about how large your appropriation was with which to build these roads; they won't care about anything except the condition of the road. You can serve the people best by building roads that will stand up."

"It is upon that fact and that alone that your reputations will rest. The people will want a road; not a memory. Traffic will probably get heavier, but you must build the roads to meet the conditions. It would not be economically proper to expect traffic to limit itself by the roads." This is the point of view which means permanent progress for motor vehicle transportation.

# Square Deal on Tax Aim of Industry

## Equal Distribution to Be Urged in Plea

### Directors of N. A. C. C. Complete Plans for Hearing Before Senate Committee

DETROIT, May 9—Directors of the National Automobile Chamber of Commerce at the May meeting in Detroit last week formulated plans for its fight before the Senate finance committee on May 16 on the proposed tax increase on automobiles and trucks. The efforts of the organization will be supplemented by those of allied interests, the National Automobile Dealers' Association already having asked for and been granted a hearing. The Motor and Accessory Manufacturers' Association and the Rubber Manufacturers' Association also will be represented at the hearings.

Directors of the National Automobile Chamber of Commerce took the position that the matter was one of such grave importance to the automotive industry as well as the country in general and that the industry is of such magnitude that the separate units should be given opportunity to present their claims individually and preferably on separate days rather than attempt to sum up all the issues in a short conference of a general committee. As a result the interests of the chamber will be represented by Chairman C. C. Hanch of the Tax Committee, George M. Graham, who will present the claims of the truck manufacturers; J. Walter Drake, of Hupp Motor Car Corp., and H. H. Rice, who succeeded R. H. Collins as president of Cadillac.

#### Hanch Outlines Appeal

"We are seeking only a square deal for one of the greatest American industries," said Chairman Hanch. "An equitable distribution of taxation is our plea, for the moment Congress puts the stamp of special taxation on an industry it brands that industry as illegitimate. It is our contention that automobiles and trucks, as President Harding so aptly put it, are essentials in the modern scheme of life, and we insist that taxation should be based on exactly the same reasoning as in the case of every other means of highway transportation."

The directors took exception to the plan of Secretary Mellon for a Federal license system in horsepower tax as an injustice to the industry which they contend is taxed to a greater degree than any other. Favoring a sales tax, preferably on retail sales, the directors will protest vigorously against any special or

discriminatory tax and will urge the removal of the present excise tax. The program as outlined and made public three months ago will be urged upon the Senate committee.

Aside from the taxation problem, the directors spent much time in discussion of the location for the annual New York show with opinion divided as between Madison Square Garden and the Eighth Regiment Armory. The matter finally was passed over until the June meeting with the feeling prevalent that the armory probably would be favored on account of the immense floor space available unhampered by posts or supports.

A campaign of education with the idea of bringing full realization of the magnitude of the automotive industry and the fact that the motor vehicle is a necessity and indispensable, also was planned by the directors to cover the entire country. Facts and Figures of the Automobile Industry for 1921, the pamphlet published by the chamber, will be sent out to 45,000 bankers, chambers of commerce, industrial leaders and universities and

(Continued on page 1034)

## Berliet Gets Ten Years to Pay Off Creditors

(By cable to AUTOMOTIVE INDUSTRIES)

PARIS, MAY 9.—By permission of the French courts, the Berliet Co. has been allowed to make an arrangement with creditors whereby its debts will be paid within a period of ten years together with normal interest. Under this plan the company will continue in business.

The Fiat factory has been reopened after being closed for more than a month. The men returned under the owners conditions.

## CALL OFF TOOL CONVENTION

WORCESTER, May 7—The spring meeting of the National Machine Tool Builders' Association which had been arranged for May 19-20 at the Traymore in Atlantic City has been finally canceled because of the condition of the industry, according to Carl F. Dietz, vice-president and general sales manager of the Norton company and who is secretary of the big organization.

## WILLYS LIGHT PRICE CUT

TOLEDO, May 9—The Willys light division of the Electric Auto-Lite Corp. announces a reduction of \$100 in the price of the Willys light. The cut has been made to meet the sharp price liquidation in the farming industry. The company asserts that for the time being the light will be sold at a loss.

## Anti-Dumping Action Unfair, Say French

### Blame Glutting of European Market on Heavy Shipments from America

PARIS, May 1 (By Mail)—Motor Transport Corps First Reconstruction Park, at Verneuil, the biggest organization of its kind left behind by the American Army in France, has been sold after standing idle for twenty-nine months. This park was built in four months by the Motor Transport Corps, and at the time of the Armistice was running with 3500 soldiers, all of them skilled hands, while 1500 German prisoners were working on the construction of additional buildings. The total area was 355 acres, and the park was laid out for the complete overhaul and reconstruction of motor vehicles of all kinds.

Immense stocks of spare parts were kept at Verneuil, and although the American Army is supposed to have prepared complete inventories, the French authorities never knew how much material was contained in this camp. M. Doucet, who had purchased the park from the French Government at a cost of 55,000,000 francs, admitted in an interview with the correspondent of AUTOMOTIVE INDUSTRIES that he did not know how much material he had bought.

The only definite information obtainable at the offices of the company was that there were 9000 unopened boxes of Ford parts. A representative of the Ford company in France who had an opportunity of opening some of these boxes stated that most of the parts were ruined by being left out in the open. On this account his company refused to purchase.

## Parts for Many Cars

The biggest stocks of parts, according to the officials of the purchasing company, are for the following cars and trucks: Cadillac, Cole, Dodge, Ford, F. W. D., Garford, G. M. C., Kelly, Mack, Nash Quad, National, Packard, Peerless, Pierce Arrow, Riker, U. S., White, Holt tractor and Harley-Davidson and Indian motorcycles. There are very few complete vehicles, for Verneuil existed only for reconstruction and supply. The park, however, had machine shops of such a complete nature that it would have been possible to build automobiles in them. All this machinery is now for sale, and the Austin buildings will also be disposed of.

The park contained 45,000 solid tires and about 60,000 pneumatics when taken

(Continued on page 1034)

# Lower Prices Stir Renewed Buying

## New York Business Shows Sharp Ascent

Sales Rise High Over Previous Months in Marmon and Jordan Salesrooms

NEW YORK, May 7—Marmon and Jordan, which announced substantial price reductions a week ago have had brisk sales both wholesale and retail in the New York territory.

Inquiries of prospects visiting the salesrooms, and of others using the mails or telephone began almost as soon as the salesroom opened Monday morning, the price reduction ads having appeared in the Sunday newspapers. Throughout the week, sales of both cars have run high in comparison with recent months.

Marmon has received several applications for dealerships in the territory. Jordan, which was seeking expansion of wholesale business, has placed several additional dealers and has received numerous applications which are still under consideration, as a result of the lowered price.

Jordan had 40 people in the salesroom Tuesday evening, two or three of whom bought cars on the spot. Since then not a single day has been a "goose egg," as far as retail sales are concerned. In other lines, the week has been considerably ahead of several recent weeks in the retail sales despite the fact that it has rained almost every day. Practically all sales made have involved a trade, but the used car market is active and fairly good prices have been obtained.

There is a noticeable improvement in truck sales. One dealer sold 24 new trucks and six used trucks in April. Another sold within five of his April, 1920, record, and his sales for January, February, March and April were within 10 per cent of those of a year ago.

Dealers who have sold trucks since Jan. 1 have had to trade in most cases and state frankly that they have made more liberal allowances than those prevailing a year ago.

Accessory and tire business is good. One large house, whose sales for several years have quite closely paralleled those in the passenger car field had a first quarter's business which was 60 per cent of 1920. April sales were better than that.

### GERDIS OBENBERGER TRUSTEE

MILWAUKEE, May 9—J. F. Gerdis, who was appointed receiver of the John Obenberger Forge Co., Milwaukee, upon involuntary bankruptcy proceedings, has now been elected trustee of the bankrupt estate under bond of \$25,000.

### COLLINS TAKES OVER OLD CADILLAC PLANT

DETROIT, May 11—R. H. Collins, who retired from the presidency of the Cadillac division of the General Motors Corp. to head the Collins Motor Car Co., a \$10,000,000 Michigan corporation, has purchased the Cass Avenue plant occupied by Cadillac before that company moved to its new location. Negotiations for the purchase were closed yesterday.

Collins stated to-day it was too early to make any announcement regarding the type of car he expects to build beyond the fact that it will be a high grade automobile which is expected to be in production by Jan. 1. He will not begin work at his own plant until he finally severs his relations with Cadillac, July 1. He still is in full charge of the General Motors company and will continue until that date. He declined to state the price paid for the property.

Collins will be allied in his new venture with W. C. Durant, who is at the head of Durant Motors, Inc. An early announcement is expected from Durant regarding the location of the main plant for the production of his car.

### Strike Threats Slow Sales in Kansas City

KANSAS CITY, May 9—The last week of April was a big one in retail sales of motor cars in Kansas City, some firms running their totals into figures large for any season. There had been a sharp upturn on volume in many lines in April, but motor cars as well as most other lines, suffered sharp depression the first week of May.

The announcement of price reductions of motor cars, was called a factor in the depression of sales. But there were many other factors, perhaps even more impelling. One of these was the existence of a delicate situation in several industries, with strikes threatened.

### LOCK SEAM PATENT UPHELD

CHICAGO, May 9—Judge Killets in Federal District Court has handed down a decision sustaining patents 1,034,954 held by the Dallas Brass & Copper Co. on their lock seam tube forming machine in a suit against the Motor Products Corp. and the Diamond Mfg. Co. of Detroit. Tubing made by this machine is used principally in the radiators of automobiles.

### Chevrolet Reduces Prices on "490" line

Will Now List Within \$100 of Pre-War Level—Look for Sales Increase

NEW YORK, May 7—Speculation concerning the plans of the Chevrolet Motor Co. regarding prices was set at rest yesterday by announcement of an average reduction of 21 1/3 per cent for the "Four-ninety" models. The new price list follows:

Touring car, \$645; a reduction of \$175.  
Roadster, \$635; a reduction of \$160.  
Sedan, \$1,195; a reduction of \$180.  
Coupe, \$1,155; a reduction of \$170.  
Light delivery wagon, \$645; a reduction of \$175.

These prices bring the Chevrolet back to within \$100 of those which prevailed in April, 1917, before the United States went into the war. In that year the touring car sold for \$550. In 1918 the price was raised to \$685 and it had stood at \$795 for nearly two years.

The Chevrolet company announced March 21 that if 50,000 cars were sold between Jan. 1 and Aug. 1, a refund of \$50 would be given to each purchaser. This refund will be paid at once to all purchasers since the announcement was made instead of waiting until Aug. 1.

The Chevrolet price cut was more drastic than had been expected and it came somewhat unexpectedly, following close upon reductions made on Marmons and Jordans. It is expected by the company that the demand at the lower price will largely increase production with a consequent lowering of overhead which will justify the decreases.

### Oakland Second of G.M.C. to Announce Price Cut

PONTIAC, MICH., May 9—The second of the General Motors Corp. subsidiaries to announce a reduction in prices was the Oakland Motor Car Co., which put a new schedule into effect to-day. The cut is \$250 on each model or 18 per cent on open cars and 12 1/10 on closed.

The touring car and roadster which were \$1,395 now will sell for \$1,145. The coupe and sedan which were \$2,065 will sell for \$1,815.

The cut in prices followed closely a visit to the plant by the chief executive of the General Motors Corp.

### STEVENS-DURYEA NEAR NORMAL

SPRINGFIELD, MASS., May 7—Stevens-Duryea, Inc., has increased production 50 per cent and has taken back 150 men. It is announced that the plant will be running on a normal basis by the middle of the month.

## Manufacturers Take Up Contract Points

### Clauses to Strengthen Dealer Credit and Customer Relations Favored at Meeting

DETROIT, May 10—In an all-day session, characterized by harmony and an apparent desire to cooperate more closely, committees representing the National Automobile Chamber of Commerce and the National Automobile Dealers Association, wrestled here to-day with vital problems brought out by the dealers. At the end of the meeting adjournment was taken until next month pending reference of the suggestions and decisions to the parent organizations.

The meeting was presided over by W. C. Sills, general sales manager of the Chevrolet Motor Co., while H. B. Harper, Philadelphia Overland dealer, acted as secretary. Although morning and afternoon sessions of the conference were executive and a formal statement issued to-night gave no details of the meeting, reports filtering from the conference room indicated it was a field day for the dealers.

Six points brought up for discussion by dealers, according to unofficial information, were received with apparent favor by the manufacturers' representatives, their attitude indicating the committee recommendations would be highly satisfactory to the dealers. Requests of dealers and suggestions for disposition of points at issue were formulated at a meeting of the N. A. D. A. directors yesterday. At the same time the N. A. C. C. directors met and outlined the course of action.

While little information concerning the meeting was available and no intimation was given as to the attitude of either side, the situation was well stated by President Jesse A. Smith of the N. A. D. A., and General Manager Reeves for the N. A. C. C.

#### Both Sides Seek Solution

"The time is here to sell cars," they said, "and we all realize that success in the merchandising of our products must and can come only through close co-operation. The prosperity of the factory is dependent on that of the dealers, and the latter's success depends solely on his treatment of customers and prospects."

The discussion ended with both sides anxious to find the solution, but the situation proved too formidable for quick decision. "It is the country dealers who are up against the real problem in the used car business," said President Smith, after the meeting, "and when you consider they comprise a big percentage of dealers of the country, you get some idea of its importance. We in the cities where proper effort is made can keep our used car stocks in fairly good shape, but the man in the small town soon finds his credit tied up in his used cars."

Three of the subjects planned for discussion discounts, exclusive representation, and freight rates were eliminated, the dealers themselves being unable to agree on discounts. A formal statement given out by General Manager Reeves after the meeting follows:

"Representatives of the N. A. C. C. and the N. A. D. A. held an all-day session at the Detroit Athletic Club to-day and considered such items as yearly contracts, used cars, parts, stocks, advertising and service to the public. Contracts were considered from the viewpoint of clauses that would strengthen the dealer with his banker and his customer on the problem of used cars.

"It was agreed that a general investigation should be made into the used-car situation by the national organizations. Sectional advertising for the benefit of the dealers, a closer and more frequent survey of parts stocks and a broadening of service plans for all users of cars and trucks were deemed necessary for the dealers' success. To-day's suggestions with additional information to be obtained after consideration by manufacturers and dealers, will be the subject of another meeting of the committees to be held in Detroit next month."

## W. E. Metzger to Handle Wills Sales in Detroit

DETROIT, May 9—W. E. Metzger, a pioneer automobile man, will take over the Detroit distribution of the Wills Sainte-Claire with a salesroom on the ground floor of the Ford Building. He expects to have a car on display in two weeks.

Mr. Metzger graduated from a bicycle agency and in 1899 handled the first electric automobile in Detroit. In 1890 he took over the Oldsmobile and helped organize the Cadillac Motor Car Co. In 1902 and 1908 he was with B. F. Everett and Walter E. Flanders, who organized a company which brought out the E M F car and later formed the Metzger Motor Car Co. In 1909 he built the Everett car and merged with Maxwell. In 1912 he was vice president of the Columbia Motor Co., and an officer and director of other companies.

## TRACTOR DISPOSAL HITS HOLT

PEORIA, ILL., May 7—As a result of the turning over by the Government to state highway commissioners of a large number of 10-ton Holt caterpillar tractors, the Holt company has closed its factory temporarily to permit of readjustment of conditions. The factory force and a part of the office staff are affected.

## A. E. A. CONVENTION JULY 4

CHICAGO, May 7—The date of the convention of the Automotive Equipment Association, at Mackinac Island, has been changed from the week beginning June 20 to the week beginning July 4. Hotel arrangements were responsible for the change.

## White Motor Makes Change in Officers

### Windsor T. White Retires as President and Is Succeeded by Walter C. White

CLEVELAND, May 9—The first shift in the personnel of officers of The White Co. since it was organized was announced at the close of the annual meeting of directors, which followed the stockholders' meeting. The change in officers marks the passing of control of the corporation from the hands of older men, who largely have been responsible for the upbuilding of the corporation. Their places will be taken by trained young men, who have come up from the ranks. The changes follow:

Windsor T. White, resigned as president of the company, and is succeeded by his brother, Walter C. White. W. T. White was elected chairman of the board of directors.

A. R. Warner, secretary, resigned, and is succeeded by T. R. Dahl, who has been assistant secretary. Warner asked to be relieved from active duty, but he was re-elected to the board of directors.

E. W. Hulet, who has had charge of production, presented his resignation, but he was asked to remain with the company in an advisory capacity and consented.

All three of the officials have been connected with The White Co. for seventeen years or more, and while the active management will hereafter rest upon the shoulders of more youthful men, the ones who have been on the job for so long will be available for advice and counsel. The new president has for some time been senior vice-president, and for years has been active in the management of the corporation.

### Teagle Becomes Director

One of the notable additions to the Board of Directors was Walter C. Teagle, president of the Standard Oil Co. of New Jersey. Teagle was born here and he is still interested in many Cleveland business and financial institutions. William G. Mather, president of the Cleveland Cliffe Irons Co., one of the leading business men of Cleveland, also was elected a director. Other directors elected are: J. R. Nutt, president of the Union Commerce Bank; Warren S. Hayden, Otto Miller, Homer H. Johnson, Albert R. Warner, Windsor T. White, Walter C. White and Thomas H. White, all of Cleveland; E. R. Tinker of New York City, and Philemon Dickinson of Philadelphia.

The retiring president told the stockholders and the directors that in his opinion the low point in business, not only in the automobile industry, but in other lines, had been passed and that from now on business would continue on the up-grade. Evidence of this was manifested in the report of the company. The regular quarterly dividend of \$1 a share was declared.

## March of Industry Continues Steady

### M. A. M. A. Analysis for April shows Unbroken Gains— July Stump Doubted

NEW YORK, May 9—A month's sustained and unbroken progress in the onward march of the automotive industry is reflected in the May analysis of conditions made public to-day by the Motor and Accessory Manufacturers Association.

"The gratifying betterment of fundamental factors noted in last month's survey is increasingly manifest in the first-hand reports and authoritative financial data consolidated in the summary for the month of April," comments M. L. Hemingway, general manager of the association.

"Payments for the last month have been better than for the three months prior," says the report.

"More firms are paying their current accounts in full on due date, and an increasing number are paying a larger proportion of their notes as they fall due, quite a number paying in full.

"Releases on old orders show a decided improvement. Many of the car and truck manufacturers are placing orders for new materials. Virtually all the car manufacturers are now showing signs of life, and this applies to the manufacturers of trucks and tractors to a somewhat lesser degree.

"Quite a number of vehicle manufacturers are operating their plants at full time or nearly so.

"Labor conditions in the automotive industry seem to be causing comparatively little trouble. There is a marked increase in labor efficiency following the readjustment period."

These statements loom up conspicuously in the chart of automotive trends plotted with the greatest possible precision by the credit and financial executives of the principal manufacturers making parts, units, and accessories for the passenger car and truck builders. Close to 400 of these parts-purveyors are affiliated with the association.

#### Group Meetings Show Trends

Through monthly group meetings for the interchange of credit information and the pooling of experiences and viewpoints, these unit and equipment makers are able to diagnose conditions in an impartial and scientific manner. No attempt is made to cloak unpleasant facts. The parts makers must face the conditions as they are. Their verdict is therefore based on evidence, not on expectation.

During the last week in April five groups of the association met to discuss business and financial conditions generally and the credit entitlements of the makers of motor vehicles. One group met in New York, the others in Chicago, Detroit and Cleveland.

The information on business conditions

brought out in the five groups showed little variation. Without exception every significant indication was constructive. Some members, to be sure, insisted that the present improvement in business is only a spurt which will be followed by a decided slump after July 1. This, however, was distinctly a minority report, in no way sustained by the preponderant weight of the evidence. The majority opinion seems to be that the improvement has been so gradual and consistent that it presages a continued increase of business along conservative lines.

#### Feeling Decidedly Better

"Altogether," says the report, in recapitulation, "there is a decidedly better feeling among our members. Collections are better and money required from banks seems to be somewhat easier. Many plants are resuming operations on a larger scale than heretofore, and the condition of extreme depression has certainly changed for the better."

Makers of automotive accessories and the smaller replacement parts report an unusually large volume of business from dealers and jobbers.

A first-hand up-to-the-minute report on automotive business conditions on the Pacific coast was telegraphed to the association's headquarters by Ezra W. Clark, advertising manager of the Clark Equipment Co., Buchanan, Mich., who is making a speaking tour across the continent, addressing local dealers' organizations and chambers of commerce. He is also placing on exhibition his oil paintings on "The Spirit of Transportation" by twelve of the leading artists of America who portrayed on canvas their "conceptions of the dynamic force of civilization—transportation."

"Business conditions on the Pacific coast show decided improvement," telegraphed Clark.

"New registrations are greater than last year, showing more sales. Dealers' associations strength in adversity has shown need of solidarity and co-operation. Organizations are putting on real sales pressure.

"San Francisco is now holding wonderful open road week. Present stocks of cars will be exhausted in two weeks.

"Many better known cars are now unable to make floor deliveries.

"Due to prohibition California has received splendid price for grape crop, many new vineyards being planted.

"Good demand for heavy trucks for highway construction and light trucks for agricultural use."

#### OVERLAND RISES 71 PER CENT

TOLEDO, May 9—The Willys-Overland Co. announces that, taking sales since the first week of March as a starting point, business has increased 71 per cent. The retail sales for the second week showed an increase throughout the country of 17 per cent over the first week, the third week an increase of 41 per cent, the fourth week a decrease of 25 per cent, the fifth week an increase of 60 per cent, and the sixth week an increase of 71 per cent.

## Industry Reemployed 31,986 Men in April

### Leathers, Textiles and Liquors Also Improve Positions—Steel Reports Declines

WASHINGTON, May 7—While the finance committee of the Senate is considering the imposition of additional taxes on the already overburdened automotive industry, the Department of Labor has made public a summary of employment conditions showing that manufacturers of motor vehicles and allied lines are virtually sustaining the entire industrial structure at a time when other lines of business are in deep depression.

The labor department report shows that there was an increase in unemployment in 28 out of 53 industrial centers east of the Mississippi in the month of April. Virtually the only places in which employment increased were centers of automotive activity. The chief gains were noted in Detroit, Chicago and Toledo. Detroit led all other cities in the percentage of increase with a gain of 25.9 per cent. The industry as a whole added 31,986 workers to its payrolls in the month, an increase of 22.3 per cent over March.

The only industries which improved their position in April were automobiles, leather, textiles and liquors. These four took on 42,630 workers, but approximately 75 per cent of this gain was in automobile and allied plants.

The report shows that in most places where the number of men out of work was reduced, automobile and allied lines relieved unemployment through gradual increases in their forces. While there was a sharp decline in the volume of iron and steel business, a good share of what was obtained came from the automotive industry.

#### DISCOUNT RATES CHANGED

WASHINGTON, May 7—Reports received by the Federal Reserve Board indicate a steady and sustained improvement in credit conditions. Large increases in reserves show that there has been a heavy liquidation of frozen credits and all the reserve banks are expected to announce a lowering of their rediscount rates in the near future. This action already has been taken by the banks in Boston, New York, Atlanta and Chicago. Boston cut its rate on commercial paper to 6 per cent, New York followed with a reduction from 7 per cent to 6½ per cent, Atlanta reduced the rate from 7 per cent to 6 per cent, and Chicago from 7 per cent to 6½ per cent.

#### HARVESTER PAYS BONUS

SPRINGFIELD, OHIO, May 7—More than 500 employees of the Springfield works of the International Harvester Co. have received extra compensation and stock certificates under the policy of the company announced last year.

## Form Moline Engine as R. & V. Subsidiary

### Company Will Be Expanded to \$15,000,000 Annual Production—New Officers Named

EAST MOLINE, ILL., May 7—The Moline Engine Co. formal organization is being completed and in addition to its established business of producing poppet-valve engines, the company will manufacture Knight engines for the R. & V. Motor Co. The Root & Van Dervoort Engineering Co. will hold all capital stock of the engine concern and thus becomes merely a holding corporation for the R. & V. industries. The automobile manufacturing plant has already been separated and organized as the R. & V. Motor Co.

Expansion of the Moline Engine Co. is announced and annual production valued up to \$15,000,000 is scheduled.

Directors of the three R. & V. unit organizations recently elected the following officers: President, H. A. Holder; vice-president, G. A. Shallberg; secretary-treasurer, S. G. Smith, and assistant secretary-treasurer, G. L. Walker. C. H. Van Dervoort was elected a vice-president of the motor company and will direct its sales. In addition to these officers the directors are O. J. Root, Rufus Walker, Jr., R. S. Hawes, J. W. Reinholdt, S. A. Mitchell and D. W. Gurnett.

With the announcement of the organization plans, formal confirmation was given of the sale of 74 acres and 15 manufacturing and administrative buildings of the concern to the Troy Laundry Machine Co. of Chicago, which, beginning Sept. 1 will move its plant to this city. This sale, it is announced, will not curtail activities of the R. & V. organizations but centralize their work.

Denial has been made to rumors that the Continental Motors Corp. is negotiating for purchase of the engine division of the organization.

### FALLS MOTORS AT CAPACITY

MILWAUKEE, May 9—The Falls Motor Co., Sheboygan Falls, Wis., a large manufacturer of motors for passenger cars, trucks and tractors, is now operating its works at full capacity to fill its orders. Some departments are working overtime and the remainder on full time. In the last few months the company has completed the installation of a new forge shop, heat treating department and a new testing shop, as well as a complete first aid hospital.

### SAMSON OFFICERS CHANGE

JANESVILLE, WIS., May 9—J. A. Craig, president of the Samson Tractor Co., division of General Motors, has announced three changes in departmental personnel. M. J. Gregory, foundry superintendent, is temporarily assigned to the Saginaw Products Co., Saginaw, Mich., but will return to Janesville when

the new foundry unit of the Samson plant is completed in about two months. J. P. Little, assistant factory manager, is transferred to the Chevrolet works at Flint, Mich. D. W. Robertson, advertising manager, has been granted leave of absence for the summer months to enable him to rest and recuperate at Northern Wisconsin lakes. President Craig recently returned from a trip to the Pacific Coast for recreation. While in the West he spent some time at the Samson company's Pacific Coast works in Stockton, Cal. In addition to tractors, the Stockton plant is putting a new design of Samson disk plow into production.

### Post and Whitney Form New Tractor Company

CLEVELAND, May 9—The Post Tractor Co. of this city and the Whitney Tractor Co. of Upper Sandusky, Ohio, have been consolidated under the name of the Post-Whitney Co. This company which is capitalized at \$10,000,000, is headed by C. P. Casatt of this city. The other officers are: Vice-president, A. B. Whitney, Upper Sandusky; treasurer, C. B. Post, New London, Ohio; secretary, F. R. LePage, Cleveland. The officers, with Ralph Blue and A. H. Weiblem of Cleveland, constitute the board of directors.

The company will maintain the plant at Cleveland where the Post tractor will be manufactured and the Whitney plant in Upper Sandusky where the Whitney tractor is being built. An announcement is expected soon regarding the purchase of an engine plant in which engines and transmissions will be built. The Whitney tractor has been manufactured for several years and is of two-cylinder, four-wheel, two-plow size. The Post tractor has been in process of development for some time and is now being put into production. It has both a front and rear drive and is of three-plow size.

### GASOLINE DOWN TO 23.4 CENTS

NEW YORK, May 7—The average price of gasoline in 30 large cities of the country is now 23.4 cents a gallon, wholesale, compared with 29.3 cents at the beginning of the year, a decline of 5.9 or 21 per cent. The sharpest declines have been in cities of the Mid-Continent district. The price in Dallas, Tex., has dropped from 31 cents to 19 cents since Jan. 1. The second largest decline was a drop of 11 cents in Tulsa, Okla. Houston, Tex., shows a drop of 10 cents a gallon and Kansas City 9.5 cents a gallon.

### MOON GAINS 27 PER CENT

ST. LOUIS, May 7—The Moon Motor Car Co. announces that its domestic business is running 27 per cent ahead of domestic business for the same period last year. This period covers the first four months. Export business practically has ceased, but notwithstanding this fact, the total gross sales for January, February, March and April exceeded sales for the first four months of last year.

## American Chain Buys Four Bumper Patents

### Licenses Are Granted to Leading Makers to Avoid Confusion in Trade

BRIDGEPORT, CONN., May 9—The American Chain Co. has entered the bumper field and has acquired ownership or control of the Hoover and Fageol patents which cover bumpers of the spring steel type, as well as the Pancoast and Grotenhuis patents of the Biflex type, covering bumpers having between the ends of the bumper bar a widened impact portion in front of the radiator.

Licenses under all three groups of patents have been granted to the following companies: C. G. Spring Bumper Co., succeeding U. S. Auto Bumper Co. and Kalamazoo Spring & Axle Co., Chicago; L. P. Halladay Co., Streator, Ill., Biflex Products Co., Waukegan, Ill., New Era Spring & Specialty Co., Grand Rapids, Mich., and Gemco Mfg. Co., Milwaukee.

These companies are authorized to use the inventions covered by these patents in bumpers made and sold by them. The American Chain Co., while it is said to intend energetically to enforce its rights against infringers, has adopted a liberal policy of granting licenses generally to responsible manufacturers upon reasonable terms.

Had it been decided to exclude others from the use of the inventions in question the results to the industry might, in view of the importance of the patents involved, have been of a serious nature, creating much confusion in the bumper trade.

### HARVESTER DEFERS PLANT

FORT WAYNE, IND., May 9—All further construction work on the big truck plant which is to be erected by the International Harvester Co. in this city has been postponed for the time being. An extension of time in which to start actual construction operations has been granted to the company by the Greater Fort Wayne Development Co., which holds the contract with the Harvester company and which was organized for the purpose of building homes in which to house the workers at the plant. The development company's office will be closed until such time as the Harvester company starts operations. Business conditions are the reason for this postponement of the work. It is believed that it may be a year before the work on the construction of the plant is resumed.

### PETROLEUM ERECTS FIRST UNIT

ROCKFORD, ILL., May 7—The first unit of the Petroleum Motors Corp., which will make kerosene burning engines, will be started in a few days and the production schedule started in 60 days. An output of 10 to 12 engines a week is expected.

## Bank Finds Prices Holding Up Buying

### Republic Bank of Chicago Predicts Automobile Reductions as Business Declines

CHICAGO, May 9—The indisposition to buy in all commodity lines is still prompted by the lack of confidence in present price levels and by the desire to buy only at bottom prices, is the finding of the National Bank of the Republic of Chicago in its résumé of April business throughout the country. At the same time it declares that further reductions in the price of automobiles is dependent upon the continuance of the present buying movement of motor cars. Prices will be lowered further, it predicts, as soon as it is seen that a stimulant for sales is needed.

"The steady improvement in the automobile industry," it says, "reflects in no small degree the demand for cars by that section of the public designated as the 'fixed income class' and by that class whose wages still leave an appreciable margin of income over necessary expenses. While shipments of automobiles in March were still 58 per cent below the volume of the same month last year, many dealers expect sales in the second quarter to approximate 75 per cent of the same quarter of 1920, which was a record. While this goal may be attained it is believed that the pace cannot be continued throughout the year, as in times past, but that manufacturing as well as selling will revert temporarily to a seasonal basis.

"It is apparent that the manufacturers themselves distrust the permanence of the present improvement, as they are keeping output closely in conformity with incoming orders, and in many cases are deliberately adhering to a fixed schedule much under the volume of new business. This is done to avoid any possible surplus, should the demand fall off, as well as to keep the demand far enough in advance of output to obviate the necessity of further price reductions which might again unsettle the industry. At the same time the matter of price reductions is being kept in reserve as a possible sales stimulant should the present buying movement wane."

### April Business Gains in Texas Territory

FORT WORTH, TEX., May 9—The automobile business in the Southwest has started on the up-grade again, according to dealers in all sections. April sales far exceed those of March and May is beginning as though it will surpass April. Comments by dealers follow:

J. B. Mikesell of Houston, whose agency extends over thirty-nine south Texas counties, declares that the dealer in standard cars is moving his automobiles rapidly and is prospering again.

Plenty of cars are being sold in Austin, says Ben M. Barker of the firm of Barker & Co. Business there, he says, is staging a come-back and the revival is taking like wild-fire.

George K. Marshall of Galveston, R. S. Carter of Galveston, William Morris of Dallas and L. E. Askew of Dallas also announce a general sales gain in their respective sections and a bright outlook for the summer months.

The settling of the weather in the Southwest, which until now has been wet and cold, has stimulated business.

### Higher Priced Trucks Lead in New Business

CHICAGO, May 8—Reports reaching the Motor Truck Mfrs. Assn. indicate that the truck industry is staging a come-back, though it may not be as noticeable as the return of the automobile. The majority of manufacturers report better business and show a more optimistic spirit than has been evidenced for many months. Conditions are somewhat spotty, but as a whole they are good considering what they have been for months past, and give every ground for the foundation of optimism.

While the preponderance of interest on the part of buyers centers in the higher priced, heavy duty trucks, there is movement in the others. Truck interest is more or less of a barometer for conditions as they prevail in general business lines and the fact that the higher priced trucks are the first to be called into service points to a resumption of activities in the larger businesses which, naturally, are the first to feel the effect of improved conditions. Users of the smaller trucks whose activities depend to a great extent on the business transacted by the larger owners will follow into the market in gradually increasing numbers.

One manufacturer of the higher priced trucks has stated that his business for the past month was better than at any time for more than a year.

### SOUTH TO EXTEND ROAD-WORK

ATLANTA, May 6—Project agreements for the construction of highways in the South in the six States comprising this district with headquarters at Montgomery, Ala., totaling \$34,831,213, have been executed, according to a report just issued. Georgia leads the district in the amount of money already obtained or to be obtained for highway work on project agreements already approved, with \$5,563,128.24 from the Federal government. Georgia will spend \$12,214,791.09 in projects that have already been approved. Of the total amount for the six States the Federal government contributes \$16,259,710.98.

### STIFFENS THEFT PENALTY

WASHINGTON, May 6—Senator Nelson of Minnesota has introduced a bill to make the moving of a stolen automobile from one state to another punishable by five years imprisonment and \$5,000 fine.

## California Business Waits Price Action

### Present Owners Found Buying to Get Full Value on Used Cars —Shows Help Selling

SACRAMENTO, CAL., May 10—The automobile trade in northern California is recovering from the reaction which followed the first return of normal business conditions. After the first impulse on the part of buyers to secure cars, there followed a lull which made dealers somewhat apprehensive, but active advertising and a following up of sales prospects has brought about what appears to be a steady buying activity.

Many smaller cities of the district have announced automobile shows, and these have been reported as having a very healthy influence on the buying public. In nearly every instance dealers of these towns report the effort and expense attending these exhibits well worth while.

Heavy damage to fruit crops through frost, and injury to the grain crops through north winds made the sales companies fearful of a decided slump, but this has not put in an appearance. The situation appears not to be so much one of a lack of money as a belief that automobiles will suffer a further drop in price. The announcement of the Jordan cut, however, did not affect the market here noticeably and the demand for smaller cars appears particularly good.

Another proof of the waiting attitude of the buying public is the fact that the bulk of the sales are to owners of cars who are turning in their old automobiles. These recognize the value of their cars will go down with any possible cut in the price of new cars and that it makes little difference to them when they purchase, so far as a change in price is concerned. The used car market is fairly good notwithstanding the resultant flood.

### PETERSON OPENS IN MEXICO

LOS ANGELES, May 6.—The Peterson Corp., which handles rebuilt cars exclusively, has extended its field to include Mexico. Its first branch in that country was recently opened at Guadalajara, the second city of the republic, and announces that additional branches will be opened at Mexico City, Puebla, San Luis Potosi, Monterrey, Tampico and Merida, thus covering the most important cities of Mexico.

### A. S. M. E. TO INSPECT PLANTS

CHICAGO, May 6—One of the industrial plants which will be inspected by the delegates to the spring meeting of the American Society of Mechanical Engineers which will be held here May 23 to 26, will be the McCormick and Deering factories of the International Harvester Co. The South Chicago works of the Illinois Steel Co. also will be inspected.

## British Car Imports Show Gain in April

### Parts Importations Fall Off Heavily But Tires Increase—Exports Active

LONDON, April 15 (By Mail)—A notable increase in the number of imported motor cars, commercial vehicles and chassis is a feature of the figures for March contained in the Board of Trade returns of imports and exports. The total is 1153 compared with 752 in February. The corresponding value has risen by \$1,600,000 for March.

A drop is apparent in the value of imported parts, other than tires, the figure being \$873,450 as against \$2,335,560 in February. On the other hand there is a slight increase in the value of imported tires, the figure for March being \$1,340,000, against \$1,066,320 in February.

Little change characterized the volume of British export auto trade in March. The total export of cars and trucks was small, the March figure being 407, a drop of 5 on the February total of 412. The value of the export of cars and trucks shows an increase, being \$1,825,500 compared with \$1,765,220 for February. The value of exported parts increased to \$668,350 compared with \$552,090 in February. The value of exported tires rose from \$837,365 in February to \$1,222,000 in March.

Imported chassis in March had an average value of \$1,450 as against \$4,810 per British chassis exported.

The foregoing exchange rates are taken as at par, \$5 to the £1.

### BRITISH REGISTRATION HEAVY

LONDON, April 8 (By Mail)—According to a just issued return of the Ministry of Transport, Britain had registered on March 10 under the new motor taxation scheme, which came into effect on Jan. 1, 281,600 motorcycles, 202,000 cars, 102,500 taxi-cabs and passenger coaches (including minibuses and charabancs), and 208,400 road trucks of all kinds. *Trucks are paying 51.3 per cent of British motor taxation.* The estimated expenditure on British roads this year is \$275,000,000, but the outlay in normal times is expected not to exceed 50 million dollars yearly.

### BRITISH MOTORCYCLE CUT

LONDON, April 15 (By Mail)—The Triumph Cycle Co., Inc., Coventry, has revised the prices of its motorcycles and motorcycle sidecar combinations, the reduction ranging from \$25 to \$75.

### MEXICO GETS FORD TRAINLOAD

LAREDO, TEX., May 7—A solid trainload of Ford automobiles passed through here this week consigned to Ford dealers in Mexico. The cars were crossed into Mexico at this point without delay and,

notwithstanding the motive power shortage in that country, the train was sent South as soon as it reached the other side of the border. It is stated that this is the first of several similar shipments that are to be made soon. Many used cars are also being shipped to Mexico. Dealers in Laredo, San Antonio, Eagle Pass, El Paso and other towns on and near the border are flooded with orders for used cars from Mexico, it is said.

### South American Feeling Unfriendly, Says Banker

YOUNGSTOWN, OHIO, May 9—W. A. Beecher, vice-president of the Mahoning National Bank and director of the Powell Pressed Steel Co., Youngstown, who has just returned from a trip through Brazil, Argentina, Uruguay, Chile and Peru with a party of bankers, states that the feeling of the people of South America is not altogether friendly toward the United States.

Organized propaganda, inspired by Germany, it is believed, is being directed against American business in South America, he states, and furthermore the business methods during the war, principally the failure to deliver goods according to contract are responsible for the unfriendliness on the part of business interests.

"Conditions in South America are somewhat depressed," says Beecher, "largely due to the depreciation of the English pound on which they base their currency. Large quantities of goods are tied up in the wharves and warehouses of South American ports, because they do not have the money to pay for them. In Buenos Aires alone 4000 automobiles are boxed up. The feeling against America is partly our fault and part of it is propaganda. When we began to fail to make delivery of goods along during the war due to our products going elsewhere and the effect was readily felt. Now the South Americans are inclined to resent it."

### WOULD CLOSE OUT AUSTIN

(By Cable to AUTOMOTIVE INDUSTRIES)

LONDON, May 7—Following the appointment of a receiver for the Austin Motor Co. a petition for the compulsory winding up of the company's affairs was presented by a creditor and ordered heard by the court. The law provides that persons interested must be represented for or against the petition and that until arguments are heard the company's assets and business must not be interfered with.

### SMALL TIRES LEAD IN JAPAN

WASHINGTON, May 7—As 96 per cent of the total number of automobiles imported into Japan are of American make, three-inch tires are universally used. The ordinary clincher type, writes Trade Commissioner Abbott, is the most popular, and the sizes in common use are 30 x 3½, 32 x 3½, 32 x 4, 33 x 4, and 34 x 4½ in.

## Light Cars Leading in British Markets

### Many Makers Rushed to Meet Orders—Opinion Differs on Price Cuts

LONDON, April 27 (By Mail)—Some extraordinary contrasts are apparent in the demands for British cars. While one or two plants now have difficulty in keeping pace with orders, others are practically closed down. In Coventry, Humber are a month behind, despite working at full pressure, Singers and Standards are also very busy and Rovers are trying hard to work up again to full production on their 8 hp. air-cooled runabout; Calthorpes in Birmingham are instituting a night shift and Wolseleys are fairly well occupied, though not operating full time in all departments.

On the other hand, Daimlers have all but closed down, and though a labor dispute is partly accountable, continued slackness is primarily responsible and has caused a lockout of the staff because the latter were not allowed by their union to work on a new basis of pay which the majority had found acceptable.

The liveliness in some quarters is not due in all cases to price reductions. Humber, for instance, have not receded a cent, in fact one model with recent improvements has increased nearly \$300. Singers and Calthorpes have made severe cuts, however, and seem to have benefited by a rush of orders on that account.

Dealers especially maintain that too much has been made of mere reduction in price and not enough of better value. The public, it would seem, takes it that a big cut means either that a car has been priced at an unreasonable level hitherto, or that it is not popular enough.

The plants which are doing best are those which are turning out good light cars, small four-seaters in particular, with a presentable finish and economical to run. That a comparatively high price is not a bar, providing the value is there, is exemplified by the demand for the improved and very slightly enlarged 10 hp. Humber. Of its type it is the most expensive, selling freely at £700 (say \$3500) for the four-seater. It is not a matter of stocking up dealers, for the latter are in many cases giving supplementary contracts.

### Guarantees Hold Up Cuts

The price guarantee system introduced early in the year has placed some firms in a quandary. While they are believing that a reduction now would induce more orders, they dare not make one owing to their commitments under the guarantee, which does not expire until July 1 at the earliest.

The whole position is very unequal. Some firms are doing well at old prices, some at lower prices; the remainder badly on either basis. The only semblance of uniformity is that nearly all those giving good value in light cars of repute are not complaining.

# Congress Orders Army Truck Sale

## Makes Obligatory Immediate Disposal

### Provision for Transfer to Roads Departments Killed—Fixes Ex- cess at 12,000

WASHINGTON, May 11—An amendment of the Army bill which passed the House yesterday makes it obligatory on the Secretary of War to sell immediately at public auction or private sale all surplus motor trucks and passenger automobiles now in the possession of the War Department. The provision in the present law authorizing the transfer of motor equipment to the Bureau of Public Roads was eliminated in the Army Appropriation bill.

The surplus is approximately 10,000 trucks and 2000 passenger cars.

Under the terms of the amendment, the Secretary of War has no choice but to sell all the motor vehicles on hand beyond those necessary for an army of 150,000 men. Auction sales of unserviceable automobiles and trucks have been held at camps by the Motor Transport Corps for the past two months. There will be another to-morrow at South Amboy, N. J., at which several hundred trucks and light delivery cars will be sold.

The introduction of this amendment by Representative Anthony of Kansas precipitated a debate as to the methods employed by the War Department in disposing of surplus motorized equipment. According to Representative MacGregor of New York, sponsor of the drastic requirement of sales, the number of army motor vehicles up to and including April 23, 1921, was 63,429, of which 50,321 were serviceable and 13,108 were unserviceable. Of this total, 53,423 were in closed storage, while 10,006 were in open storage.

With the proposed reductions in effect, the authorized retention of motor vehicles for the army of 150,000 men would be 4245 passenger vehicles, 19,652 trucks, 4218 trailers, 5058 motorcycles, 2048 ambulances and 1328 vehicles of special designs, making a total of 36,541 motor vehicles for the regular army.

### Senate Gives Mellon Anti-Dumping Power

WASHINGTON, May 12—Senator Ball of Delaware informed AUTOMOTIVE INDUSTRIES to-day that the anti-dumping bill, which passed the Senate yesterday, authorizing the Secretary of the Treasury to levy customs duties in cases where an investigation disclosed unfair

competition, would protect American dealers against reimportation of surplus war supplies sold abroad by the Federal government. The automotive industry had hoped that a clause would be inserted in the bill covering this subject specifically, as European speculators contemplate throwing enormous quantities of motor vehicles and equipment on the American market.

Because of drastic changes made in the Senate in the anti-dumping bill, it is expected a bitter fight will follow when it goes to conference in the House. This may result in a disagreement and throw the bill back for passage through both houses.

Formation in New York of an import organization which proposes to sell \$3,000,000 worth of automobile equipment purchased from the Slough Trading Co. of England, is expected to stir automobile manufacturers and dealers to such an extent that they will attempt to convince Secretary of the Treasury Mellon that an inquiry into this competition is essential for protection of American industry. The finding of investigators would determine the amount of duty which Mellon could levy to equalize domestic prices and quotations.

If the Senate and House conferees fail to agree on the bill as it passed the Senate, opportunity would be given automotive organizations to express their views on the subject if they cared to avail themselves of the chance.

### Mixer Is Invited to Head Pierce Arrow

NEW YORK, May 11—George W. Mixer, who has represented G. W. Goethals & Co., Inc., in the management of the Pierce-Arrow Motor Car Co. since 1919, has been invited by the directors of the Buffalo company to become the president of Pierce-Arrow, and it is understood that he will sever his connection with Goethals to accept.

Goethals & Co. were employed by the Pierce-Arrow company to assist in bringing the plant to a peace-time basis and also to aid in reviving its line of cars and trucks. This work has been accomplished and a new line of vehicles, both passenger and commercial, has been placed in production.

Mixer has been in active charge of the plant since that time and his management has been entirely successful.

### MOORE PROMOTERS ON TRIAL

ST. LOUIS, May 11—Six promoters of the Moore Motor Vehicle Co. of Danville, Ill., went on trial in Federal Court here to-day on charges of using the mails to defraud. They are accused of having sold stock amounting to \$1,500,000 without return to the purchasers.

## Tire Companies Cut to New Price Level

### Goodyear Reduction Ranges 12 to 15.8 Per Cent—Kelly De- crease Largest

NEW YORK, May 11—With the announcement of a price cut, ranging from 12 to 15.8 per cent on tires by the Goodyear Tire & Rubber Co., practically all of the larger Akron companies have revised their lists.

Firestone, as part of its price revision plan, will produce a new 30 x 3½ smooth tread tire, to sell at \$13.95. The company declares this to be the lowest priced of any standard tire of that size on the market. Cord prices are cut 12 per cent; fabrics, 17 per cent, and tubes, 20 per cent.

Miller has cut cords 12½ per cent; fabrics, 17½ per cent, and tubes, 20 per cent. The new prices reduce the 30 x 3 fabric tire from \$17.25 to \$14, and the 30 x 3½ cord, from \$32 to \$24.

The 12 per cent cut by Goodyear is on cord tire prices. A 15 per cent cut is made on the general run of fabrics, with a 15.8 per cent reduction on some sizes of fabrics. Tube prices have been reduced 20 per cent.

United States Rubber Co. has reduced prices from 11 to 20 per cent; the minimum cut on cord tires and the maximum on plain tread tires and gray and red tubes. A 15 per cent reduction is made on Usco treads and a 17½ per cent cut on knobby and chain treads.

Kelly-Springfield Tire Co. makes a straight 20 per cent reduction on all pneumatic tires except Ford sizes, which are cut 22 per cent. Tubes are reduced 30 per cent.

Fish Rubber Co. has reduced prices from 12½ to 20 per cent.

Lee Rubber & Tire Co. reduced 20 per cent in the price of cord and fabric tires and 15 per cent in puncture proof tires.

Keystone Tire & Rubber Co. has made a straight 20 per cent reduction.

Thermoid Rubber Co. has made a price cut on all Ford sizes of 28 per cent; on 4½-in. sizes, 23 per cent, and on all other sizes, 20 per cent.

### Erie Tire President Guilty of Embezzlement

TOLEDO, May 10—Peter F. Wills, president of the Erie Tire & Rubber Co., was found guilty of embezzlement of \$29,793 of his company's property by a jury in common pleas court at Sandusky last Friday night. The jury was out twelve hours. Sentence was withheld for a few days.

## Square Deal on Tax Aim of Industry

### Highway Committee Approves Principles of Townsend Bill—Push Advertising Plans

(Continued from page 1033)

colleges and a similar number of cards bearing the statement of President Harding, declaring the motor vehicle a necessity, will be sent out to dealers and garage men for prominent display where it will attract the attention of the general public.

The Highway Committee met Tuesday, when the principles of the Townsend bill were approved, and Roy D. Chapin, chairman of the committee, and George M. Graham were named to go to Washington and present the views of the chamber. More vigorous efforts in the educational campaign for better roadways were decided upon through the agency of schools and colleges and by personal and printed appeal to the general public.

The Truck Committee also met Tuesday and spent much time in consideration of the anti-dumping bill pending before Congress. It was said strong pressure would be brought to bear to insure Congressional action against the reimportation of trucks. The plan for co-operation with the railways to secure the short haul business for motor trucks was given much consideration and arrangements made for presentation of the truck manufacturers' plan to the Interstate Commerce Commission, with the feeling prevailing that the railways now are in a receptive mood and that definite agreement on a policy for division of this business would result.

#### Reeves Talks Advertising

With the idea of stimulating closer co-operation between the advertising managers of the automobile and truck companies and the National Automobile Chamber of Commerce a meeting of the advertising men was held Friday, presided over by Alfred Reeves, manager of the chamber. Reeves emphasized the point that service and advertising now are the vital factors in the merchandising of motor vehicle and declared the time had come when the advertising manager must be lifted out of the rut and given his proper place in the administrative effort looking to sales promotion. He pointed out some evils that exist and cautioned the ad men against repetition. In a critical time like this, said Reeves, every man must be unusually careful to see that every word that goes out as advertising copy carries a real message to the consumer.

H. R. Hyman, advertising manager of Cole Motor Car Co., read a paper on "New Forces in Automobile Advertising." Hyman took his fellows to task for some of the crude methods that have marked their efforts and laid stress on the value of illustrated advertising of

the right sort. He deplored the tendency toward freak pictures and urged more thought and less anatomy in illustrations. Efforts to convince the public that the automobile is a necessity and to educate the owner to its proper use were urged by Hyman, who declared the industry was struggling with a buyers' market and if the product was to be merchandised properly it must be through advertising. The dealer, he said, is demanding co-operation of the factory in his effort to get to the consumer and urged that the advertising manager now has the big opportunity to show his real merit.

#### Dart Presents Paper

H. G. Dart, advertising manager of Paige Detroit Motor Car Co., read a comprehensive paper on "General Advertising Plans That We Have Found Helpful," in which he told of experiences in his own factory with especial reference to the mistakes and the benefits of the lessons learned. He pointed to many instances where beneficial results in sales promotion were traceable directly to efforts of the advertising department and urged more careful thought and study in the preparation of material that was designed to appeal to the prospective purchaser.

General discussion followed the reading of the papers in which many joined and in which the good and bad effects of various efforts were threshed out. Decision to affiliate with the National Automobile Chamber of Commerce as an advertising managers branch was reached and assurance was given Reeves of full co-operation of the ad men.

### N.A.C.C. Committeemen to Confer in Washington

NEW YORK, May 10—The representatives of the National Automobile Chamber of Commerce who will appear before the Senate finance committee in opposition to increased Federal taxes will hold preliminary conferences at Washington Friday, Saturday and Sunday in preparation for the argument next Monday. The hearing will be given specifically on the question of excise taxes and the burden of the argument will be against discriminatory imposts.

The National Automobile Dealers' Association also has asked for a hearing on the excise section of the revenue law and this also may be granted Monday, but at a different hour. The course of the Motor and Accessory Manufacturers' Association and the Rubber Association of America in relation to appearances before the finance committee has not been definitely determined, but M. L. Hemmings, general manager of the M. A. M. A. will appear with the N. A. C. C. committee unless his association is granted a separate hearing.

The N. A. C. C. decided that inasmuch as it was not the chief proponent of the sales tax, it would not make an appearance this week with the industries which are advocating that form of tax.

## Anti-Dumping Action Unfair, Say French

### Compelled to Take Thousands of Cars After Armistice—Would Turn Some Back

(Continued from page 1033)

over by the French Government. Most of the pneumatics were used by the French army or sold privately, but the solids remain, and are to be thrown on the market, after having stood in the open for more than two years.

It will be a difficult matter to dispose of more than a fraction of these spare parts in European countries, for the stocks are out of proportion to the number of vehicles in service here. The purchasers declare that it is their intention to sell in big lots, as far as possible, and to dispose of this material in America if purchasers can be found. It is thought that these supplies will interest American jobbers, manufacturers, and big truckers. A thoroughly commercial sales organization is being gotten together.

French opinion fails to understand why America should protest against the shipment of American army automobiles, trucks and parts to the United States. One leader of the French industry declared a few days ago:

"We were obliged to take 80,000 American automobiles after the Armistice. After the thousands we had purchased for our own army from the States, it was insisted that we continue to take delivery of automobiles months after the end of the war. The price of these stocks was fixed in dollars at a time when the dollar was only worth 8 francs, and we are now having to pay at the rate of 14 francs to the dollar."

"Despite all this the American automobile industry protests because a few thousands of her own vehicles are likely to be thrown on her market. America seems to look on the return of these vehicles as unfair competition, forgetting that in the first place she forced us to absorb immense stocks for which we had no need, thus flooding our market and contributing in a very large degree to the present glut. It is fortunate for us that there was no clause in the agreement against the return of this material to America, and personally I only hope that the whole of the remaining American automobile material will be shipped back to its country of origin."

#### PUSH STRAIGHT SIDE TIRES

NEW YORK, May 9—The executive committee of the foreign trade division of the Rubber Association of America has adopted a tentative program covering foreign advertising and publicity. The committee is giving its attention to the promotion of straight side tires abroad and protection against price declines on foreign sales. Reviving European competition has made necessary immediate action on the straight side tire problem.

## Production in April Exceeds 1920 Total

### Ford Output of 90,125 Leads Former Year by 40,000—Most Companies Gain

DETROIT, May 11—Automobile production in the Detroit district in April numbered 140,955 vehicles, compared with 119,213 in April, 1920, and 105,245 in March of this year. Ford production alone in April amounted to 90,125 cars and trucks, as compared with 51,066 for the same month last year.

Dodge also increased production last month and went several hundred over the record for April, 1920. Buick showed an increase of several hundred over March, although its April output was approximately 3000 behind that of April, 1920. Chevrolet, which was about 1000 behind April of last year, increased its output over March by about 2000.

Dort's April output was slightly in excess of March, but about 300 under April, 1920. Hudson and Essex both ran considerably behind the figures for a year ago. Hupp, on the other hand, with an output of approximately 2000 last month, showed an increase of about 700 cars over the same month last year and approximately 600 more than in March.

The Lincoln Motor Co. built an average of 15 cars a day last month, and is operating on a schedule of 17 a day for May. The Olds Motor Works reached a production of about 2800 last month, which was about the same as in that month last year and an increase of 500 over March.

Packard built 625 "single sixes" last month, as against 670 in March, and 700 "twin sixes" in April, 1920. Paige slumped slightly in April in comparison with April, 1920, and also with March of this year.

Reo made a big spurt last month, producing 2750 cars and speed wagons, as compared with 2350 in March and a decrease of only about 300 as compared with April of last year. Studebaker, with an output in its Detroit and South Bend plants of 7825, went close to 3000 over March.

#### Body Shortage Slows Reo

April production schedules which were outlined in March failed to materialize in most instances. This was due to various causes. Reo, for example, was forced to curtail production because of inability to obtain bodies. Officials of the company said to-day that if an adequate supply of bodies could have been obtained production would have run close to capacity. An interesting fact in connection with the Reo business is that its foreign trade has fallen to approximately half its normal total. This company will make practically the same number of vehicles in May as in April, working short time but with a full force.

Oldsmobile shipments in the first quarter of this year were approximately

5000, as against 8500 for the same period last year. Olds is working full time with a force practically normal, building "fours" at Saginaw and some light "eights" at Lansing.

Olds production figures for the last five months, which are more or less characteristic of most companies, show the steady upward trend of business. In December, Olds built an average of 33 cars daily, in January 47, in February 40, in March 82 and in April 100. The rate for May thus far has been 104. The schedule for June is 119. These figures refer to the Saginaw plant. The company has had no truck production.

#### Lincoln Adds Distributors

The Lincoln company has increased the number of distributors from 15 to 50 in the last 60 days, and President Leland says the company is selling all the cars it can make, chiefly in New England and on the West coast.

The Denby Motor Truck Co. built 70 vehicles in April, which was about 35 per cent of capacity. General Motors turned out 650 at its Pontiac plant.

The business of parts manufacturers in the Detroit district showed an increase for April over March. Continental Motors is operating about 55 per cent of capacity, and the Timken-Detroit Axle Co. about 20 per cent.

The Motor Wheel Corp. reports a payroll larger than at any time since Jan. 1, having taken on 400 in the last 60 days. The Wilson Foundry & Machine Co. at Pontiac expects to be working at 50 per cent of capacity by the middle of May with a large increase in number of employees.

The O. J. Beaudette Co. of Pontiac now has 1085 men working in its body shop and is working night crews in its metal and tool departments. The Michigan Drop Forge Co. also has returned to a normal basis in the number of employees and is above normal in production. The factory is working 20 hours a day with two shifts.

#### SUPREME SUES ON STOCK

AKRON, OHIO, May 10—Suit to collect \$200,000 alleged to be due on unpaid subscriptions for stock in the Supreme Cord Tire & Rubber Co. of Akron has been filed in the Summit County Common Pleas Court by Scott Kenfield, receiver of the company. B. L. Eaton of Greenville, Pa., is sued for \$100,000 for stock which he is said to have subscribed for in April, 1920. Eaton was the company's former fiscal agent. The other defendants to Kenfield's action are all directors in the defunct company.

#### F. PHILIP DORN DIES

CLEVELAND, May 9—The death is announced of F. Philip Dorn, for twenty years secretary and general manager of the American Ball Bearing Co. His health began to fail several years ago and he retired from active business when his company was merged with the Standard Parts Co. A year ago he suffered serious injuries in an automobile accident and this hastened his death.

## Position of Willys Steadily Improves

### Stockholders Told of Reduced Bank Loans—Sales Policy Conservative

TOLEDO, May 11—Reorganization of the internal affairs of the Willys-Overland Co. was made complete at the meeting of stockholders held here to-day when the executive committee was increased from five to seven members and the finance committee was eliminated. President John N. Willys addressed the stockholders and promised them that he would devote his entire time to the rehabilitation of the company until it gets back into the front rank.

"I shall work harder in the next twelve months than I ever did until I know that Willys-Overland is in its rightful position," Willys declared.

"This institution is my pet and I have just as much faith in it as I ever had. I shall not shirk my responsibility to the stockholders."

Willys told the stockholders that there will be no immediate reduction in the prices of the company's cars notwithstanding many rumors that Overland would join the companies making price cuts.

"We are watching the situation closely and are pursuing a conservative sales policy," Willys said.

"There is a market for the cars at the right value. The history of the automobile industry is not over yet. Companies that will survive conditions will be those that have the best management and which have eliminated loose methods. We have cut expenses to the bone. There are many bright spots in the future and we have reason to be hopeful."

"We have \$6,700,000 in cash on hand. Agents throughout the nation report increasing inquiries for our cars. Last week showed the biggest increase in retail sales since last September. We are building the best organization we ever had at the Toledo plant and we will continue on a conservative sales policy."

#### Report to Show Profit

"We owe \$20,000,000 less than we did a year ago. We have cut our inventories down to \$38,000,000. Our annual report, which has been delayed for several days, will show a profit for the year."

The stockholders re-elected substantially all of the old directors; they are: J. N. Willys, W. P. Chrysler, C. B. Wilson, James E. Kepperley, J. R. Harbeck, E. R. Tinker, Elisha Walker, Edward F. Swift, Rathbun Fuller, C. B. Mertz, George R. Spencer and C. E. Killinger.

Willys praised the work of Charles B. Wilson, executive vice-president of the local plant, who, he declared, has succeeded in getting the plant down to an economical, efficient basis.

## Maxwell Holding Company Formed

**\$40,000,000 West Virginia Corporation Also Will Take Over Chalmers**

NEW YORK, May 11—The Maxwell Motor Corp., capitalized at \$40,000,000, has been incorporated under the laws of West Virginia to take over the assets of the Maxwell Motor Co., Inc., and the Chalmers Motor Co. The company is authorized to manufacture and construct automobiles, motors, engines, etc., and to do all things incident to the business of building motor cars.

Formation of the new corporation is one of the final steps in the reorganization and consolidation of the Maxwell and the Chalmers interests. It had been supposed that the Chalmers name would be retained in the corporate title of the new company, but it apparently has been lost, although manufacture of the car will be continued. The physical assets of the Maxwell company in Detroit will be bid in to-morrow at a receiver's sale by the reorganization committee headed by Walter P. Chrysler. No other bids are expected. When the process of acquiring the assets of the two companies is completed they will be assigned to the West Virginia corporation.

The incorporators of the new company are clerks in the law offices of Albert Rathbone, the attorney who represents the reorganization committee. Directors and other officers will be elected as soon as the reorganization is complete and the board will include representatives of both the Maxwell and Chalmers companies.

The stock of the Maxwell Motor Corp. is divided into 200,000 shares which have a par value of \$100 each, and 800,000 which have a total value of \$20,000,000. The charter was the first large one issued in West Virginia since the enactment of the non par stock law. The company is the second largest ever granted a charter by the Secretary of the State of West Virginia.

### Court Denies Appeal to Stop Maxwell Sale

DETROIT, May 11—United States District Judge Arthur J. Tuttle yesterday denied a petition of first preferred stockholders of the Maxwell Motor Co. in which the petitioners asked to intervene in the sale of the company, set for to-morrow.

The petitioners asked to intervene on the grounds that the proposed merger of the Maxwell and Chalmers Motor companies would take away their holdings and give them only a small share of the stock of the new company.

The court ruled that such a step would prevent reorganization of the company and thereby endanger the future of the concern.

Attorneys for the reorganization interests argued that the reorganization plan was fair, giving all classes of shareholders representation in the new company and making it possible to procure funds with which to liquidate the more than \$15,000,000 indebtedness of the concern and to continue in business.

The petition of Holmes Jones of Wilmington, Del., asking a stay in the sale pending settlement of litigation in Delaware courts, was dismissed by Judge Tuttle on the grounds that it contained improper statements.

Attorneys for the first preferred stockholders obtained permission from Judge Tuttle to file a new petition for intervention at the time of the court's confirmation of next Thursday's sale.

According to certain holders of first preferred stock, under the reorganization plan stockholders surrender \$17,603,964 of first preferred, according to book values, and get in exchange \$2,561,013 of stock in the new company. Of second preferred, it was alleged, \$2,172,337 will be exchanged for \$987,441 in new stock. The common stock is reported as of no value, but the holders will get in return therefor \$501,384 of new stock. Holders of Chalmers preferred will receive \$1,029,600 in new stock for \$4,519,722 old stock, and the holders of common stock, of no value, will get \$557,543 of new stock.

Judge Tuttle held the concern must have new money in order to save that already invested. He said bankruptcy would ruin the company and declared to stop the sale would likely kill the whole undertaking. Appointment of a permanent receiver, he said, would be a detriment to shareholders in that it would interfere with sales, for no man would buy a car from a concern in receivership.

### G. M. Export Names Officers

NEW YORK, May 12—At a deferred annual meeting of the stockholders of the General Motors Export Co., directors were elected as follows: Curtis C. Cooper, Paul Fitzpatrick, J. Amory Haskell, Norval A. Hawkins, Alfred P. Sloan, Jr., Peter S. Steenstrup and Alfred H. Swayne.

At the subsequent organization meeting of the directors, the following officers were elected: Haskell, president; Fitzpatrick, vice-president; Steenstrup, vice-president; Swayne, vice-president; Austin S. Murray, treasurer; Thomas S. Merrill, secretary, and George H. Bartholomew, assistant secretary.

### Body Receiver Named

DETROIT, May 12—The Security Trust Co. has been named receiver for the Detroit Weatherproof Body Co., with a factory at Corunna, Mich., pending sale of the property. The action is a friendly suit, brought by the Michigan Steel & Metal Co. The body company has liabilities of approximately \$650,000 and assets estimated at present market value to be worth \$200,000. They consist chiefly of materials which actually cost about \$700,000.

## Stockholders Ratify Goodyear Financing

**Almost Unanimous Sanction Given Program—Seiberling May Stay as President**

AKRON, May 12—Stockholders of the Goodyear Tire & Rubber Co. ratified yesterday the \$85,000,000 refinancing and reorganization program. More than 90 per cent of the common stock and more than 82 per cent of the preferred stock voted in favor of the execution of a first mortgage on the company's property to secure \$30,000,000 in 20-year 8 per cent first mortgage gold bonds and \$30,000,000 in 10-year first mortgage 8 per cent gold debentures.

Action of the stockholders completes the necessary steps preliminary to definite reorganization of the company. Plans of reorganization and the new official personnel will be announced at noon Saturday, to which time the meeting was adjourned. President F. A. Seiberling was given an ovation by stockholders and was unanimously elected chairman of the meeting. As he called the session to order the stockholders rose and cheered him.

No intimation has been given here by the interests which now control the company concerning the new management. It has been persistently reported, however, that G. M. Stadleman, one of the vice-presidents, would succeed Seiberling as president. On the other hand, the reception given Seiberling by the stockholders has led to belief in some quarters that he will be retained as president, although with greatly curtailed powers. The resignations are expected of C. W. Seiberling as vice-president and of P. W. Litchfield as vice-president and factory manager.

## Timken Company Gets Truck Makers' Views

DETROIT, May 12—More than two score manufacturers of assembled trucks in which products of the Timken-Detroit Axle Co. are used, responded to an invitation from Fred Glover, general manager of the Timken company, to attend a meeting here yesterday for a discussion of the unit parts servicing problem. The conference was called by Glover to obtain the views of the truck makers on this subject. He informed them his company, while desirous of giving the best service possible to the public, was anxious to adopt whatever plan was most satisfactory to the manufacturers themselves.

Several of the manufacturers expressed their opinions on the subject, but no decision was reached. One proposal was that a dealer "pool" of all parts be established in the hope of insuring service, rather than direct distributing depots maintained by parts manufacturers.

## Kansas City to Show Evil of Credit Ban

### Automotive Organizations of Entire Federal District Back Liberality Appeal

KANSAS CITY, May 9—The visit of Governor Harding of the Federal Reserve Board to Kansas City May 21, arranged through the National Automobile Dealers' Association, will be the occasion for a conference with representatives of the automotive industry of the Tenth Federal Reserve District.

The most elaborate feature of the Harding visit will be a dinner Saturday evening, May 21, at the Hotel Muehlebach; but this will be chiefly the opportunity for the delivery of an address by Governor Harding to the industry. There are to be conferences during the day in which automotive distributors from many states will participate with Federal Reserve officials and Governor Harding.

Arrangements for the governor's coming are being made by E. E. Peake, secretary of the Kansas City Motor Car Dealers' Association. He will be met at the train Saturday morning by the directors of the association, who will take breakfast with him at the Hotel Muehlebach. The governor will then be taken for an outing in a ride over the boulevards.

For the business conference and the dinner, the Kansas City Association has tried to provide representation from every organized group of automotive distributors in the Tenth Federal Reserve District. The conference Saturday afternoon will be the opportunity for presenting to Governor Harding and J. Z. Miller, governor of the Kansas City Reserve Bank, the subject of rediscounts of automobile paper.

#### Many to Present Subject

To present this subject, besides the men from the Kansas City Association, will be one man from each of the automotive organizations of the district. These representatives will be selected from the committees of three from each organization, invited to Kansas City to meet Governor Harding at the evening event. Through this arrangement, the situation throughout all the states, and parts of states of the entire district will be laid before the federal bank officials, and the size of the industry in the West will be demonstrated, as well as the phases in which the previous attitude toward automobile paper has affected various interests.

At the dinner, besides the members of the local association, there will be present members of the Kansas City Tractor Club, bankers whose institutions constitute the Kansas City Clearing House Association, committees from each of the 30 civic bodies represented in the Club Presidents' Round Table, and the committees of three men each from

the automotive organizations of Kansas, Nebraska, Colorado, Missouri, Arkansas, Oklahoma and Texas. In the last-named group will be committees from some sections that have not established organizations, the men invited being from the industry, however.

Acceptances have been received to most of the invitations transmitted to dealers in the territory. It is expected that attendance at the dinner will reach 600.

Governor Harding will spend at least one day, perhaps more, in Kansas and Oklahoma, prior to the Kansas City meetings. He will have opportunity to secure information from the districts visited, and will therefore reach Kansas City with a fresh knowledge of conditions. He is to address a bankers' meeting at Topeka Friday on the subject of motor car paper.

Governor Hyde of Missouri will be present at the dinner to deliver an address of welcome.

### Hart-Parr Cuts \$200 on Model "20" Tractor

CHARLES CITY, IOWA, May 9—The Hart-Parr Co. has reduced the price of its "twenty" tractor from \$1,195 to \$995, factory cash list. This places the "twenty" in actual competition with all makes of tractors in the 10-20 class. The factory is gradually increasing production of this model and shipments are moving forward steadily.

In addition to this price cut, the Hart-Parr Co. has improved and extended the scope of its sales financing plan, thereby helping the dealers still further to solve their financial problem.

A meeting of divisional sales representatives from all parts of the United States and Canada was held at the factory last week. It was the general opinion that the worst of the business depression is over and that bright sales spots are appearing where dealers doing systematic work actually are selling tractors. It is expected the next sixty days will see a rapid improvement in the tractor market.

The Hart-Parr factory has not been closed entirely but has been running on a limited production schedule because it was determined not to pile up an inventory but rather to manufacture only as fast as the field absorbs its product. The steel foundry was reopened last week.

### FORT WAYNE CONDITIONS GOOD

FORT WAYNE, IND., May 9—Business among the local automotive concerns is very much on the up-grade. Dudo Mfg. Co., makers of magnet wire used by Ford, has been re-employing men right along; General Electric Co. is picking up, and the manufacturers of lock devices for cars are also showing a distinct spurt in business. Among the retailers business is brisk. Several dealers state that business so far this year is as good or even better than it was up to the same time of last year. Business generally throughout this section has been pretty fair all spring.

## METAL MARKETS

It would seem as though the steel market, for the time being at least, is once more obstructed by anticipation of further price reductions. The general expectation is that the leading interest will not delay unduly long readjustment of its selling prices, once the 20 per cent cut in labor costs, which will go into effect shortly, has become operative. Moreover, buyers look for additional wage cuts by the "independents" and the latter may shave their prices even before the United States Steel Corporation does, provided actual orders can be booked as the result of such cuts. The blind alley which the market presents at this writing discloses in nearly every department remarkable pliancy of prices, a condition that is the natural forerunner of the lowering of quotations. Those who disseminated early in May news of heavy buying of sheets by one of the large builders of low-priced passenger cars have admitted freely that the actual tonnage placed was very light, and that what really did happen was that a number of sheet producers were asked to furnish their lowest quotations on a modest amount of deferred deliveries. This tonnage was pyramided by multiplying the quantity under discussion by the number of producers who were asked to quote. In fact, very little of the tonnage actually ordered by this interest represents new business, nearly all of it being on account of old contracts prices governing which have been amicably and equitably adjusted. A good deal of this sheet tonnage consists of material for frames that is sold on a plate basis. What orders were placed for the latter stock, which runs No. 12 gage and heavier, are presumed to have been taken at very close to 2c., Pittsburgh base. The bulk of this body stock, as well as of the light sheets which were ordered forward from northern Ohio mills, is for immediate requirements, and no fresh commitments for deliveries beyond the next four weeks are reported. Body builders, credited with having inquiries from the Cadillac Motor Co., are canvassing the market for quotations on suitable gages of sheets. Report has it that this company has placed a fair-sized order for cold-finished steel bars. Nowhere, however, is there any indication of buying for deliveries beyond June 30, and this stresses the belief of buyers that prices for third quarter deliveries will shortly move in their favor.

**Pig Iron.**—Cleveland pig iron interests report that the Ford Motor Co. is again placing orders with automotive foundries for castings conditional upon purchases of pig iron from the Ford furnace. The market for foundry and malleable remains slow with quotations generally on a basis of \$24@\$24.50, valley.

**Steel.**—Producers of cold-rolled strip steel are increasing their operations as the result of better inquiries from those who make automotive parts. Nominally the cold-rolled strip steel market is on a 5.50c. basis, while the hot-rolled is quoted at 2.75c. All of this buying, however, is for prompt shipment.

**Tin.**—The tin market presents the strange spectacle of having been lifted 20 per cent over its 1921 bottom without the least sign of a recovery in consuming demand, speculation having performed this feat unaided by consumers.

**Lead.**—It remains to be seen whether the advance that has elevated lead prices in the "outside" market to over 5c. New York, will be sustained. Basic conditions, however, are conceded to have improved.

## FINANCIAL NOTES

**Fisher Body Ohio Co.** stockholders will receive one-fifth of a share of Fisher Body Corp. stock and \$3 in cash under the exchange plan now declared operative. The Fisher Body Corp. guarantees the payment of the current quarterly dividend upon the preferred stock of the Ohio company down to and including the dividend payable on July 1, 1922. The company also agrees to pay on or before that date the accrued dividends for the year 1920. The dividend accruing April 1, 1921, is expected to be paid by the Ohio company.

**H. H. Franklin Mfg. Co.**, in a balance sheet as of Dec. 31, shows total assets of \$13,174,902, in which is included property, \$7,738,595; cash, \$1,748,295, and inventory, \$7,614,696. Liberty bonds total \$684,630 and accounts and notes receivable \$591,203. Liabilities show an increase in the preferred stock from \$2,000,000 in 1919 to \$3,324,800, and in common from \$1,855,700 to \$6,887,478. Accounts and notes payable total \$7,233,180. Reserve for depreciation totals \$1,049,014.

**Parish & Bingham Corp.** in a balance sheet as of Dec. 31 shows total assets of \$5,696,770, an increase of \$210,184 over Aug. 7, 1919. This includes cash of \$281,419; inventories, \$1,957,704, and accounts receivable of \$375,844. The company's surplus of \$2,332,363 is approximately \$800,000 less than the surplus on the 1919 date. Real estate and buildings and machinery and equipment, however, has grown \$1,200,000 since 1919.

**Premier Motor Corp.** in a balance sheet as of Dec. 31 shows assets and liabilities of \$3,225,682. The assets include an inventory of \$1,218,622; cash, \$15,615; accounts receivable, \$72,550; reserve on drafts, \$207,884; patents, good-will, etc., \$443,719. The liabilities include deferred liabilities of \$881,227; accounts payable, \$94,056; acceptances payable, \$78,573; notes payable, \$403,794, and dealers deposits of \$20,166.

**Pierce-Arrow Motor Car Co.** for the first quarter of 1921 reports net operating loss after depreciation, charges and taxes of \$489,502. In the first quarter of 1920 earnings amounted to \$717,265, which, after payment of preferred dividends, amounted to \$2.07 a share earned on common stock. The deficit this year is ascribed to poor truck business.

**Michigan Drop Forge Co.** shows total assets of \$598,808.83 for 1920, with surplus of \$86,136.32. Cash in hand and in bank was \$39,925.07; accounts receivable, \$53,175.10; notes receivable, \$25,361.09. Inventories are given as \$244,024.05; reserves, \$87,085.09. Current liabilities were \$72,989.11.

**Timken-Detroit Axle Co.** has declared the regular quarterly dividend of 1 1/4 per cent on preferred stock June 1, to stock of record May 15. The company, however, has passed the dividend on common. The last bi-monthly dividend of 2 per cent on common was paid January 15.

**Nash Motors Co.** paid a dividend of \$1.75 a share on the preferred stock on May 2. On the recommendation of President C. W. Nash the board of directors authorized some important extensions to the company's present plants.

**Kelly-Springfield Tire Co.** has issued \$10,000,000 in notes as part of its plans for financing, through a syndicate composed of H. P. Goldschmidt & Co., Lehman Bros., Halsey, Stuart & Co. and Goldman, Sachs & Co.

**Willard Storage Battery Co. of Canada, Ltd.**, has been incorporated with a capital of \$500,000 and head office in Toronto, Ont.

**Titan Automatic Tool Co., Inc.**, Brooklyn, has filed schedules in bankruptcy with liabilities of \$66,068 and assets of \$61,139.

## Willys to Float Bonds to Meet Bank Loans

**TOLEDO**, May 10 — Announcement was made here this week that the Willys-Overland Co. expects to take care of its bank loans, due Nov. 1 under the extension agreement, by means of a large bond issue to be offered to the public. If such a plan is carried into effect it probably will mean abandonment of the proposal made some time ago by the bankers interested for a consolidation in a new corporation of the Willys-Overland Co., the Willys Corp. and the other interests controlled by John N. Willys. Increased business recently has permitted substantial reductions in bank loans but they still run into many millions of dollars.

As a new means of increasing sales of Overland cars, each of the 7000 employees in the plant here has been made a salesman under a new plan by which he is paid \$10 for each prospect reported which results in a sale before June 1.

## Lockwood to Continue Accessory Production

**KANSAS CITY**, April 30 — The purchasers at bankruptcy sale of the Lockwood Mfg. Co. have announced plans for operating the Lockwood automobile accessory factory as a unit in the business of the Baker-Lockwood Mfg. Co., Inc., Kansas City. The purchasers were W. C. Sommerville, president, and Walter L. Wilson, vice-president and treasurer, of the Baker-Lockwood Company. There is to be no change of name or official roster. The automobile accessory factory will be operated as the Lockwood factory, with Wilson as general manager. Sommerville will manage the Baker factory. R. M. Secor, secretary of the Baker-Lockwood company, is made sales manager of the Lockwood factory business, Secor having had charge of the automobile accessory sales, with headquarters in New York until about a year ago, when the Lockwood interests withdrew from the Baker-Lockwood company, taking the automobile accessory business with them.

## INTERLOCKING TO PAY CLAIMS

**AKRON**, May 11 — Officers of the Interlocking Cord Tire Co. have petitioned the court to absolve the receivership and dismiss Elihu Harpham as receiver. It is stated that an agreement has been reached with the creditors under which the company will pay 15 per cent on claims 30 days after the discharge of the receiver, 15 per cent in three months thereafter, 20 per cent six months thereafter, and the remainder within a year with promissory notes bearing 8 per cent interest. The statement is made that stockholders have raised sufficient money to cover the first payments to creditors.

## BANK CREDITS

*Written exclusively for AUTOMOTIVE INDUSTRIES by the Guaranty Trust Co., second largest bank in America.*

**NEW YORK**, May 12 — Secretary Mellon summed up present conditions by saying that the financial situation was improving and that the industrial situation was practically unchanged. The action of several of the Reserve Banks in the past week seemed to confirm his judgment of the financial situation. Following the reduction of its discount rate by the Boston Federal Reserve Bank several weeks ago, the New York Bank last week announced a reduction of its discount rate on commercial paper from 7 per cent to 6 1/2 per cent. The 7 per cent rate had been in effect since June 1, 1920. Since that time the Atlanta Bank has reduced its rate from 7 per cent to 6 per cent, and the Chicago and Minneapolis Banks from 7 to 6 1/2 per cent each. The Dallas Bank is now the only bank in the system which maintains a 7 per cent rate on commercial discounts.

The New York call money market eased last week after opening on Monday with a renewal rate of 7 per cent. The renewal rate for the remainder of the week was 6 1/2 per cent. There was a freer supply and an easier undertone after the New York Bank had announced the cut in its discount rate. The range for the week was 6 1/2 per cent to 7 per cent, as against 6 per cent to 7 per cent the week before. Time money also showed a slight easing. Sixty to ninety days' and four months' paper was quoted at 6 1/4 per cent to 6 3/4 per cent, and five and six months' paper at 6 per cent to 6 1/2 per cent, as against 6 1/2 to 7 per cent for all maturities up to six months in the previous week. The amount of business done was moderate, but trading was dull with a disposition to wait on further reductions in rates.

The stock market last week showed a decided upward trend, with a reaction, however, over the week-end. Many industrial stocks made new highs for the year, as did also a few railroads. The bond market was also buoyant, with many foreign government and municipal bonds and our own Victory 4 3/4s making new high records for the year. The same tendency was noticeable in the foreign exchange markets, where as many as 1/2 dozen European currencies made new high records for the year. The pound sterling at \$3.98 1/4 was at the highest since last June, and the French franc at 8.36 1/2 was at its highest since last July. Exchange on Norway and several of the South American countries, on the other hand, made new lows for the year.

## HOOD STARTS THREE SHIFTS

**WATERTOWN, MASS.**, May 9 — Evidence of marked improvement in the tire trade situation is shown by the increased activity of the Hood Rubber Co., manufacturers of Hood tires and tubes, which to-day began working three full shifts.

## MEN OF THE INDUSTRY

**Guy H. Peasley** has been named sales manager of the Olds Motor Works, succeeding Charles A. Tucker, who resigned to devote his entire attention to the business of the Nebraska Oldsmobile Co., Omaha, of which company he is president and general manager. Peasley has been with Olds since 1911, when he started as a stenographer and bill clerk in the sales department. He worked his way up by successive steps, having been distribution manager for four and a half years, and during the past year assistant sales manager.

**Homer K. York** has been appointed assistant secretary and treasurer of the Indiana Truck Corp., Marion, Ind. Previously he had been supervisor of production and service for four years. Cecil B. Warner has been appointed western manager for the company, with headquarters at San Francisco. He was formerly connected with the Nelson and Gramm-Bernstein.

**Homer J. Forsythe**, manager of the construction division of the engineering department of the DuPont Co., has been transferred to the position of assistant general manager of the Hyatt Roller Bearing Co. of Newark, N. J., a subsidiary of the General Motors Corp. Forsythe had been with the engineering department of the DuPont company since August, 1906.

**Ralph D. Webster** has rejoined the selling forces of the Wire Wheel Corp. of America, and for the time being will make his headquarters in Detroit. Webster, a real veteran in the automotive industry, and a graduate of the older bicycle trade, was formerly sales manager of the controlling wire wheel organization.

**John Jay Ide**, who has been a frequent contributor to AUTOMOTIVE INDUSTRIES on craft subjects, has been appointed technical assistant in Europe of the National Advisory Committee for Aeronautics. His headquarters will be at the Paris office of the committee. He sailed May 3.

**Edmond Rumpler**, director general of Rumpler Auto & Airplane Works of Bavaria, accompanied by his purchasing director, Herman Aumer, is spending some time in Detroit visiting factories and conferring with business men with a view to the purchase of machinery for his plant.

**Don Warren** has been appointed vice-president and general sales manager of the Wolke Lead Batteries Co., Louisville. Elmer Brandell has been appointed advertising manager and W. G. Sauer has been appointed manager in charge of sales and sales promotion work.

**P. J. Eubanks**, who for the past two years has been serving as chief engineer and manager of the Aero Products Co. of Cleveland, has resigned to devote his entire time to the duties of chief engineer of the consulting engineering firm of Rush & Eubanks, that city.

**E. J. Mueller**, domestic sales manager of the Harley-Davidson Motor Co., is leaving that organization. He has no definite plans for the future, but intimates that he will continue in the motorcycle business, possibly in the retail sales field.

**W. B. Blood**, vice-president Campbell, Blood & Trump, has been made director of sales and advertising of the Ray Battery Co., Ypsilanti, Mich. Blood will retain his offices with the former concern in an advisory capacity.

**C. L. Alexander** has been appointed manager of sales promotion for the Elgin Motor Car Corp. He has been assistant sales manager since October, 1920, and formerly was connected with Lozier, Dodge and Maxwell-Chalmers.

**H. G. Shirley**, who has become well known to the automotive industry as a highway speaker, representing the Federal Highway Council, has been named as highway engineer for Baltimore County, Maryland.

**O. N. McCool**, who was formerly sales manager of the Commonwealth Motors Co. at Chicago, has joined forces with the Seneca Motor Car Co. at Fostoria, Ohio, as its Western representative.

**O. M. Peters**, formerly heavy line works manager of the Emerson-Brantingham Co., Rockford, Ill., has been appointed general works manager of the American Machinery Co., Kennett Square, Pa.

**S. S. Jenkins** has been appointed general sales manager of the Bijur Motor Appliance Co., Hoboken, N. J. He was formerly Detroit district sales manager for the company.

## INDUSTRIAL NOTES

**Toledo Automotive Products Co.** has taken an exclusive license for the manufacture and sale of the Dorr Miller differential. Among the officials and stockholders are G. Huette and R. W. Randall, formerly of the Falls Motor Works; A. R. Class, president of the Toledo Steel Products Co.; C. E. Thompson and J. A. Krider, of the Cleveland Steel Products Co.; G. S. Salzman, of the H. J. Walker Co.; R. M. Bean, of the Durston Gear Corp.; D. A. Shaw, president of the Grant Motor Car Corp., and R. J. Goldie, of the Columbia Axle Co.

**Milwaukee Circulating Pump Co.**, manufacturing circulating oil, water and other fluid pumps, and a subsidiary of the Milwaukee Shaper Co., has been acquired by a new corporation, the Cramer Mfg. Co. of Milwaukee, capitalized at \$50,000. The present plant will be continued until such time as business warrants the erection of a new works. Officers of the Cramer company are: President, William L. F. Graf; vice-president and general manager, Robert Cramer; secretary and treasurer, William E. Graf.

**Bridgeport Coach Lace Co.** has established a factory branch at 1449 So. Michigan Avenue, Chicago, where a complete line of its products will be carried. T. N. Wakeman will be manager of the new branch. The company was formerly represented in Chicago territory by Blumenthal Bros.

**Milwaukee Snow Conveyor Co.**, a new \$25,000 corporation, has started production of a new type of rotary snow plow designed by A. F. Krueger, Milwaukee. It will be built for mounting with tractor and motor truck chassis, street and steam railway trucks, etc.

**Mutual Truck Mfg. Co., Sullivan, Ind.**, has abandoned its intention of removing its plant to Peru, Ind. A. W. Petrie, inventor of mechanical features of the truck, has sold his interests for \$50,000. It is thought he may start a factory at Peru independent of the Mutual company.

**Gregory Tire & Rubber Co., Ltd.**, Vancouver, B. C., has started operations and will have a capacity of 500 tires and 1000 tubes a day when in full production. The company is incorporated for \$1,500,000. Morton Gregory is president.

**Cleveland Tractor Co.** will operate temporarily on part time. The factory has been in full operation all winter. Business of the company is good and it is expected that dealers will liquidate their stocks in the near future.

**Taft-Peirce Mfg. Co.**, manufacturer of machinery and tools and employer of 700, is shutting down May 9 for a week and will open again May 16 on full time. It has been operating on a four-day basis.

**Independent Tire Co., Chicago**, has changed its name to the Better Tire Co. No change has been made in the personnel or management, and the policy of the company will remain as heretofore.

**Alvord Reamer & Tool Co.** has opened a direct factory branch in Chicago under the management of C. B. Cole, formerly manager of the Union Twist Drill Co. at Chicago.

**No-Leak-O Piston Ring Co.**, Baltimore, reports a sales increase for the first quarter of 1921 of 75 per cent over business in the 1920 quarter.

**International Motor Co.** has removed its New York offices to the new 22-story office building of the Cunard Line at 25 Broadway, which was opened this week.

To Merge Three Plants  
of Kelly-Springfield

**NEW YORK**, May 9—J. V. Mowe, general sales manager of the Kelly-Springfield Tire Co., who has returned from the formal opening of the company's new \$11,000,000 plant at Cumberland, Md., announces that the twelve acres of manufacturing space now available in the new factory will make it possible to combine the Buffalo, Worcester and Akron factories in one plant, thereby producing cord and fabric casings, tubes and solid truck tires on a scale which the company never before has been able to approach. The immense new plant is said in some respects to be the finest in the world. Cumberland was selected because of its strategic location for the distribution of tires, the shipment of crude rubber from nearby ports, the proximity of the West Virginia coal fields and the favorable labor situation.

## STEVENSON TO START PLANT

**DETROIT**, May 6—The Stevenson Gear Co., incorporated with a capital of \$3,600,000, will begin work this month on a factory to cost \$1,500,000 and to employ about 500 men. The company is headed by Richard T. Wingo, president and other officers are Frank C. Sibley, secretary, and G. W. J. Linton, treasurer. G. E. Stevenson, inventor of the product the company will manufacture, and E. B. Johns are members of the board of directors with the officers. The company will manufacture gears on special machines, the invention of Stevenson, and expects to be in production in the fall. The Stevenson Gear Co. of Indiana, the parent company, now has a \$10,000,000 company in operation in that city.

# Calendar

## SHOWS

Sept. 28 - Oct. 8—New York, Electrical Exposition, 71st Regt. Armory, Electric Equipment, Machinery and Vehicles.

Nov. 27-Dec. 3—New York, Automobile Salon, Hotel Commodore.

January—Chicago, Automobile Salon, Hotel Drake.

## FOREIGN SHOWS

May 28, 1921—Czecho-Slovak International Automobile Exposition of Cars, Trucks, Tractors, Motorcycles and Equipment. Prague.

May 28-June 8—International Automobile Exhibition, Basle, Switzerland.

June, 1921—Reykjavik, Iceland, Agricultural Exhibition—Agricultural Machinery—

Icelander Agricultural Society, Reykjavik, Iceland.

September—Buenos Aires, Argentina, Passenger Cars and Equipment. La Pabellon de las Rosas. Automovil Club Argentino.

September—Buenos Aires, Argentina, Cars, Trucks, Tractors, Farm Lighting Plants and Power Farming Machinery. Palermo Park; Sociedad Rural Argentina.

September—Luxemburg, Luxemburg, Agricultural Sample Exhibition.

Oct. 5-16—Paris, France, Paris Motor Show, Grand Palais, Administration de l'Exposition Internationale de l'Automobile, 51, Rue Perigolée, Paris.

Nov. 4-12—London, British Motor Show, Society Motor Mfrs. and Traders.

May, 1922—Quito, Ecuador, Agricultural Exposition, celebrating Centenary of Ecuador. Automotive Section.

## CONVENTIONS

May 17-19—Buffalo, Convention of Factory Service Managers, Auspices of Service Committee, N.A.C.C.

May 23-26—Chicago, A.S.M.E. Spring Meeting, Congress Hotel.

May 24-28—West Baden, Ind., Summer Meeting Society of Automotive Engineers, West Baden Springs Hotel.

July 4-9—Mackinac Island, Mich., Summer Meeting Automobile Equipment Association.

Oct. 12-14, 1921—Chicago, Twenty-eighth Annual Convention National Implement & Vehicle Assn.

## RACES

May 31—Indianapolis, International Sweepstakes.

June 3-5—Reno, Nev., First Annual Nevada Highway Road Race.

June 18—Uniontown, Pa., Speedway Events.

July 25—Grand Prix, Le Mans.

Labor Day—Uniontown, Pa., Autumn Classic.

## S. A. E. MEETINGS

Dayton Section—May 17, H. L. Horning.

Cleveland Section—May 20.

## Court Clears F. W. D. of Conspiracy Charge

MADISON, WIS., May 9—The Wisconsin Supreme Court has dismissed the complaint of R. P. Rohloff and other former stock holders in the F W D Auto Co., Clintonville, Wis., against directors and officers of the corporation, claiming conspiracy and fraud in keeping information of importance from them. The decision affects merely the right of a group to bring suit, and does not go into the merits of the action. It will mean that to recover it will be necessary for stockholders to sue individually.

The case involves hundreds of thousands of dollars to investors who sold their holdings just before large Government contracts were made. The plaintiffs were mostly original stockholders who helped form the F W D company in 1909. They claim the defendants induced them to dispose of their holdings in 1914 without informing them concerning actual and prospective contracts for thousands of F W D trucks for European belligerents. It is claimed that stock of a par value of \$100, sold for that price in 1914, was actually worth \$900 in 1917, 1918 and 1919.

Further action by the plaintiffs in accordance with the decision is promised immediately.

## Factory to Direct Marmon in New York

NEW YORK, May 9—Under a new operating arrangement just worked out, the Marmon Automobile Co., of New York, distributor of the Marmon in the Metropolitan territory, will come under the direction of the officers of the Nordyke & Marmon Co. A. R. Heiskel, treasurer of the Nordyke & Marmon Co., has been elected president of the New York corporation, and S. S. Toback and Frank Carrie, vice-presidents. Toback, until he retired from the New York organization several months ago, to do some special work for the factory, was

general sales manager. Carrie has been vice-president of the local company for some time.

The change in plan does not make the Marmon representation in New York a factory branch. The company remains a separate entity.

## United Motors Tells New Service Plans

NEW YORK, May 10—Plans of United Motors Service, Inc., for the extension of replacement parts service direct to consumers through dealers and garagemen throughout the country were discussed at a three-day convention of New York territory distributors.

In introducing the plan Fred A. Oberheu, salesmanager, asked the distributors to assist in the extension of the service in their respective territories through selling small dealers and garagemen United Motors Service contracts. He pointed out that the prime object of the extension of the sales plan at this time was to make it possible for every motor car owner to get service and genuine replacement parts for any of the company's products through the establishment of selling and servicing connections in the smaller communities.

Oberheu also explained the national advertising campaign through trade publications, nationally circulated periodicals and newspapers, which is to support the extension plan with an educational program stressing the use of genuine parts, and enlarging on the fact that material and workmanship rather than dimensions are the factors to be considered in the satisfactory replacement of parts in these products.

The convention, which opened Monday, followed an interesting program of sales and service topics which were discussed by the following representatives of the company: F. A. Oberheu, salesmanager; D. M. Sweeney, superintendent of distribution; J. W. Parry, manager of the technical department, and R. L. Stevens, of the technical department.

## Durant Coast Plant

### to Be Started at Once

OAKLAND, CAL., May 7—R. C. Durant, son of W. C. Durant, the former president of the General Motors Corp., has returned here and announced that the new Pacific Coast assembly plant of Durant Motors, Inc., will be located in this city and actual construction work is to be commenced within the next thirty days. The younger Durant is to head the Coast project just as he formerly headed the Pacific Coast Chevrolet organization.

The local plant is to be operated under the name of the Durant Motor Co. of California. The company is capitalized at \$3,000,000, and of this amount young Durant has taken \$2,000,000, while his associates and their friends have taken more than half of the remaining million. Among Durant's associates in the Coast unit of the Durant enterprise are C. M. Steves, A. and L. Warmington, H. T. McKnight, Capt. A. G. Waddell, J. E. Appleby, Capt. Eddie Rickenbacher, Chas. Dunham and a number of others.

## Milwaukee Factories

### Show Early May Gains

MILWAUKEE, May 9—Gradual increase in the operating forces of the Milwaukee shops manufacturing motors, frames, parts and automotive equipment generally, which was the rule throughout April, has been slightly accentuated so far in May as the result of the broadening demands of passenger car and motor truck manufacturers. The makers of cars and trucks in this district likewise are effecting further increases in production, orders now being considerably ahead of current production. The situation is improving steadily, although slowly. Things are picking up in the tractor industry as well, but makers are still stocked with finished goods and a better demand has not yet been reflected into production requirements of an appreciable extent.